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Vol. 48, No. 3

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JUN 18 1951

Contractors *and* Engineers Monthly

MARCH, 1951



New Jersey Highway Department Photo

Typical of modern divided-highway design, New Jersey's Route 4 Parkway (see page 47) features wide right-of-way, contour grading, flat slopes, and grade separation.

Covering the Field

● Road-Revenue Leaks

Where they occur and how we can stop them. Page 3 carries this article, which is particularly timely right now.

● Garage, State Building

A new garage in downtown Richmond, Va., will hold over 550 cars. Page 5. Earthquake joints feature a new state building in Portland, Oreg. Page 56.

● Snow Fight

Weather is capricious in this western district, so men and machines stay constantly alerted. See page 11.

● Meetings Galore

Of the NYC building trades (page 16), traffic engineers (page 31), of the HRB (page 39), of photogrammetry experts (page 68), and of equipment distributors (page 99). Mobilization was the special event at many meetings.

● Viaduct Spans Harbor

Its concrete piers were poured by pipeline and by floating plant. Page 18.

● Big Pipeline

It carries utilities on a university campus. Part of it had to be jacked under a busy boulevard. Turn to page 26.

● Town Road

Vermont experiments with a mixed-in-place mat of gravel and either asphalt or tar. Page 36 describes a typical project.

● Parkway Design

What constitutes the complete modern highway? New Jersey's First Parkway is the example discussed on page 46.

● Road-Base Stabilization

It took 6 borrow pits to get the select base material for this job, page 52.

A blend of soil and asphalt makes a back road something to be proud of. Page 97.

● Concrete Paving

A dual-highway stretch gets an oil spray after curing to prevent scaling. Page 60.

● Mattresses Line Bank

Concrete squares are cast in a big yard, with the help of two complete plants, for Mississippi bank revetment. Page 64.

● Plant-Mix Improvement

On page 72, an old concrete road gets a new face of plant-mix for 4.3 miles.

● Bookkeeping Made Easy

This continuation of last-month's article covers simple records on which a summary ledger is based. Page 78 explains the records and pictures them.

● Dam Intake Structure

And what a nightmare! Not enough space, intricate forming, concrete temperatures to control. Take a look at page 82.

● Penn Turnpike Grading

It was rougher on the 67-mile western extension than on the eastern. Page 90 covers a typical roadway contract, including drainage and structures.

● Altimetry in Surveying

Its principles, its techniques, and the latest uses that have been developed are discussed thoroughly on page 104.

(You will find "In This Issue" on page 4)



Aero Service Corp. Photo

The eastern extension of the Pennsylvania Turnpike as seen from the air. It continues the Turnpike 100 miles from Middlesex, near Carlisle, across the Susquehanna River south of Harrisburg, to terminate at King of Prussia on the northwest perimeter of metropolitan Philadelphia. (See C. & E. M., June, 1950, pg. 34)



Fort Worth District, Corps of Engineers, Photo

Major General Lewis A. Pick (right), Chief of Engineers, inspects Benbrook Dam near Fort Worth, Texas. With him are, left to right, Project Engineer Ketchum, Southwestern Division Engineer Prentiss, and District Engineer Freeman.

NEWS AND VIEWS

of the construction industry — volume and trends, state and Federal legislation, materials, people

Some months ago we noted that **expansion plans in the steel industry** pointed to an annual production of about 110,000,000 tons by the end of 1952. More projects have been mapped since then, and the total will be even higher—117,500,000 tons, or an increase of nearly 45 per cent over 1940. That increase alone exceeds the entire capacity of any other country in the world. But 1952 is still a long way off, and meantime here's a chilling note: New York's Governor Dewey has been advised by Defense Mobilization Director Wilson, apropos of N. Y. Thruway plans, that **drastic steel priorities will go into effect soon, which will halt most highway construction and probably all but vital capital expenditures.** Wilson's letter read in part: "Very little steel can be expected for new highway work other than access roads to new defense projects. Thus, thoroughways, parkways, and similar developments, even though helpful to civil defense, must wait. On the other hand, maintenance becomes of increasing importance, and every effort will be made to provide materials for this purpose. New building construction will also find it difficult to obtain steel. Here, too, every effort will be made to support the

construction of schools and hospitals . . . In the field of public housing, priority must be given to defense housing projects and little, if any, steel will be available for other projects . . ."

Perhaps it's time to say something on this page about the future of **communal bomb shelters in our present garrison economy. They're still highly problematic.** 1. States simply don't have the money to match \$2.5 billion in Federal funds. 2. Nor do they relish building shelters according to the Federal plan—with no peacetime function. 3. Should the plan be broadened to include projects that would double as underground garages, states contend that off-street parking projects are a municipal, not a state, responsibility. 4. And cities are even less able than states to finance the plan. 5. Even some Federal officials are lukewarm, since the plan couldn't possibly give all citizens adequate protection, and states would face the ugly task of deciding which cities merited full protection, which partial, and which none. Meeting in late January, the executive committee of the Governors Conference recommended further study before voting appropriations. They agreed, how-

ever, that "family shelters and the improvement of existing facilities are desirable."

Pending a general licensing system effective February 15, the **National Production Authority in January banned virtually all new private commercial-building construction.** Blanket exemptions: buildings already under way (meaning those into which a substantial quantity of building materials had gone) and new construction or alterations where the cost would not exceed \$5,000 in one year. Left unaffected: wholesale food establishments . . . wholesale supply facilities for fuel oil, gasoline, coal, gas-distributing systems, and pipelines . . . and storage or warehouse buildings used by manufacturers or producers. For the rest, special authorization is required on the basis of defense effort, public health and welfare, or special community need. Union leaders estimated **the order would make 20,000 skilled workers idle in New York City,** since few war plants to absorb the workers are likely to be built on the east coast.

Guess it's time—and no mistake—to tighten our belts and sharpen our ingenuity, if we're to make do with what we have, and make it last.



A Lorain Pipeliner hoe of Oklahoma Contracting Co., Dallas, goes in ankle-deep and then some to lay a new Maine-to-Montreal oil line across the Fore River at South Portland.



Merritt-Chapman & Scott Corp. Photo

A steel casing for the trench-type tunnel under the Elizabeth River at Norfolk, Va., comes off the ship ways at Sparrows Point, Md. After a 180-mile trip, it will be fitted by Merritt-Chapman & Scott with ring of concrete and a section of double-lane roadway, and sunk in place. (See C. & E. M., Nov., 1950, pg. 48)

Let's Stop the Leaks In Highway Revenues

icient Administration and
urrent Needs Require Better
of Funds at the Federal,
State, and Local Levels

W. HUME EVERETT, Chairman,
Wyoming Highway Commission

TO be a strong nation we must first
individually strong; government-
we are no stronger than the small-
unit. It is therefore with a sense of
in a high degree that we must
at present highway administra-
Leaks in highway-user revenues
so large as to cause a serious threat
the very freedoms we have known
the past and earnestly desire in the
future.

Federal Diversion

One of the greatest leaks in highway-
revenue occurs in the Federal govern-
ment, which creates the myth of
Federal aid for highways. To be spe-
cific, the Federal government has col-
lected since the inception of the Fed-
eral gasoline and related user taxes
about four times as much as it has re-
turned to the states by way of Federal
aid.

If the entire amount collected from
gasoline and related taxes by the Fed-
eral government were levied by the
states instead, it would not only be
more carefully spent but most states
would receive about four times the
amount now received from Federal Aid
for highway construction.

Effect of Inflation

Perhaps the greatest leak in highway-
revenue is brought about by in-
flation. The Government's attitude, ac-
tions, and inactions have helped to
bring it about. Such inflation creates
a serious problem for highway admin-
istrators. You all know from your own
research and experience that today the
cost of highways is about twice as
much as in 1939. Where inflation will
stop, no one knows. Are we going to be
strong or are we going to sell (or spend)
ourselves down the river?

Federal Administration

The Federal-Aid Highway Act of
1948 increased the amount of Federal
funds to be used for administration
purposes from 2½ to 3¼ per cent of
all moneys apportioned under the Act.
It can be argued that the present pe-
riod of inflation has made necessary
this 50 per cent increase in Federal
funds for administrative purposes.
However, the increase has not been
limited to increase of salaries; it has
been an increase in Federal control ex-
ercised all along the line, particularly
in construction activities.

The original intent of the Federal
Highway Act passed in 1916 was to aid
the various states financially in the
building of highways. The Federal
agency selected in the early days to
look after the Federal government's
interest was intended to act as a con-
sultant or advisor to the state high-
way departments and to establish uni-
form standards of design, specification,
and methods of construction, modified
as necessary to meet different condi-
tions existing in the various states. To-
day the Federal control being exer-
cised in highway matters has increased
disproportionately.

If the states or their officials are
properly operating their highway de-
partments, being entrusted to spend
large sums of state money for high-
way purposes, they should also be con-

sidered equally capable of handling the
Federal funds which come out of the
same pocket—the taxpayer's. Less Fed-
eral money spent for administrative
purposes, red tape, and control will in

the long run result in more miles of
highway being built for the taxpayer
on a more economical basis.

Excessive Control

Bureau of Public Roads engineers are
often unflatteringly referred to by con-
tractors as the "blue book boys".
Recently two very reliable and respon-
sible contractors reported that all con-
tractors bidding on any Federal-Aid
work in Wyoming added an arbitrary
extra 10 to 15 per cent to their bids to

take care of the frills, the hand rak-
ing of borrow-pits, the stone polish-
ing, and other activities which cause
them needless trouble and expense be-
cause of the unrealistic and arbitrary
attitude of the "blue book boys".

In addition, the time lost and effort
spent in seeking to get the Bureau to
be economically realistic about its en-
gineering requirements is a costly loss
to highway departments and to the tax-
payer. The system of passing the buck

(Continued on page 87)

Indiana rejuvenates
a worn highway

21 miles of US-6 are
undersealed and resurfaced
with Texaco Asphalt

When Indiana decided last year to recondition
21 miles of US Route 6, it was not satisfied with
half-way measures. Before constructing a new
asphalt wearing surface over the old concrete
pavement, the state highway department specified
that all voids which had developed under the
pavement be filled with asphalt, thus restoring
full support to the slab.

The material used to fill voids was a Texaco
Asphalt of 25-35 penetration, which road builders
have pumped under a substantial mileage of old
concrete and found ideal for the purpose. Ap-
proximately 105,000 gallons were needed to fill
all voids under this 21-mile highway.

For the new wearing surface, Indiana called for
a plant-mixed asphalt pavement laid in two
courses, each 1½ inches thick. Gravel was em-

ployed as aggregate, with a Texaco Medium-
curing Cutback Asphalt serving as binder in the
mix. Emulsified asphalt was used to prime the
old concrete pavement and to seal the new asphalt
surface.

Today, with available road funds failing to
keep pace with increasing traffic demands, it is
more important than ever that America protect
its investment in existing highways. As demon-
strated on Indiana's US-6 project, Texaco Asphalt
products help salvage old, worn paving just as
effectively as they help construct new highways.

Two helpful booklets which describe all
types of Asphalt construction for streets and
highways can be secured without charge by
writing our nearest office.

Constructing two-course Tex-
aco Asphaltic Concrete pave-
ment on 21 miles of US-6 in
northern Indiana, after the old
pavement was undersealed with
a 25-35 penetration Texaco As-
phalt. View of completed project
at right. Undersealing by Fen-
ton Construction Company, Ash-
land, O. New surface laid by
Brooks Construction Company,
Fort Wayne, Ind.



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For the Highway and Heavy-Construction Industry

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Stopping Highway-User Revenue Leaks

Convention speeches, unfortunately, usually follow a set pattern in which the speaker generally tells the delegates things they like to hear. He may praise his audience for what they have done or are doing, or what they hope to do in the future. Or if he is not verbally glad-handing or back-slapping, the man on the rostrum may be presenting some long-winded and dull statistical review that lulls his hearers into a cataleptic stupor. So, like a refreshing breeze of clean, cool air, the words of W. Hume Everett, Chairman, Wyoming Highway Commission, swept through the recent annual meeting of the American Association of State Highway Officials, leaving some serious thoughts for consideration, and some individual soul-searching.

Everett discussed measures of a highway department in preventing leaks in highway-user revenues. He covered the subject so thoroughly and from diverse aspects, that what he had to say is recommended reading for anyone with an economic stake in the highways of this country. That includes practically everybody, from the engineers and contractors who design and build the roads and bridges, right on along to John Q. Public who uses them and of course pays for them. The text of the western

highway chief's remarks pertaining to the stopping of such leaks is given on page 3 of this issue.

These words could not have been spoken at a more opportune time. The international situation is bound to affect the highway program, and while road building probably deserves less to be cut than other types of construction, these leaks in user revenues should be plugged first, so as to lighten the effect of possible retrenchment in legislative appropriations. Everett points the finger at the myth of Federal aid for highways, one of the greatest leaks in highway-user revenue, whereby the Federal government collects about four times as much in Federal gasoline and related user taxes as it returns to the states.

He also focuses attention on the "blue book boys", as some contractors call the Bureau of Public Roads engineers because of their "unrealistic and arbitrary attitude" to engineering and construction requirements. As Commissioner Everett succinctly states: "Less Federal money spent for administrative purposes, red tape, and control will in the long run result in more miles of highway being built for the taxpayer on a more economical basis." That sounds good to us. What do you think?

Political Football

The violent attack by New York's Governor Dewey on those who want highway-user revenue earmarked for highway purposes contained some of the strangest reasoning ever presented by a politician. "If they get this stupid idea put into the Constitution as they have in some states," ranted the Governor, "pretty soon all revenue from alcoholic beverages will be earmarked for the benefit of the drunks." How stupid does the Governor think the people are to swallow this form of abuse? Does he consider stupid the voters of 21 states which have already adopted constitutional amendments ending the diversion of motor-vehicle revenue so that such revenue can be used solely for highway purposes? Certainly none of these states has since voted to give "drunks" any revenue collected from alcoholic beverages.

Politicians like a free hand in spending money obtained by taxing the public. The present New York State administration is faced with the job of providing funds for pay raises promised to state employees and teachers during the last election campaign. Hence the Governor's irritation at the mounting opposition to his plan to sell short the highway system and use highway funds

elsewhere. New York is in the top five of the states practicing diversion of highway-user revenue, and in 1949 diverted \$28,500,000. In 1948, \$32,000,000 was diverted, and in 1947 the diversion totaled \$74,000,000 out of the \$141,000,000 total tax collected.

In a state that had 3,437,439 registered automobiles, trucks, and buses in 1949, second only to California in total registration, the highway system cannot be neglected. Especially when New York State had the third-highest toll of motor-vehicle traffic deaths that same year with 1,904 fatalities.

Charles H. Sells, former Superintendent of Public Works under Dewey and now Executive Director of the New York Good Roads Association, has been fighting vigorously to stop this diversion of highway income, and no doubt is aware of the great political pressure that must be overcome to achieve his goal. "Of course I expected opposition," admitted Sells, "but not opposition from such a power." Especially when the Governor, only two years ago, conceded that over one-third of the state's highways "are old and worn out" and "a hazard to the public and a drag on our economy."

New York needs every cent of high-

way revenue it can get to put its road system in safe condition for the highway traffic it carries. It cannot be done with the Governor calling for still greater diversion.

Not More Highways But Safer Highways

To the Editors,
CONTRACTORS AND ENGINEERS MONTHLY:

The public was startled to read of 22,000 deaths in 1950 against 19,000 casualties in 1949. . . Have we made any attempt to tabulate these deaths and accidents to learn the cause or make our highways safer? . . .

Last year I did a little research of my own. In three garages in this town I found 29 total wrecks which accounted for 13 deaths out of that 22,000. The causes of the accidents and deaths were too narrow a pavement, no shoulder, chuck holes along the sides of the pavement, and slippery pavements. All these accidents could have been averted had the highway engineer done sufficient research to eliminate the cause. For example, frost upheavals . . . have caused uncounted drivers to lose control of their cars. These frost upheavals . . . show a lack of engineering research in soil moisture and . . . drainage to insure a firm foundation. . . .

Instead of spending a billion dollars on new highways let us appoint a commission of experts . . . in the various lines included in the construction of a safe highway . . . and before we construct new highways let us make the roads now in use as safe as they can be made. Many of the present roads should be widened and proper safety shoulders should be supplied. Proper foundations should be designed. . . . If nonskid pavements can be used, then a law should be passed making their construction mandatory on all roads. All pavements should be of the same design . . . and all counties and states should be forced to construct their pavements in keeping with the general specifications.

I am of the opinion that every truck owner and driver will approve of the idea.

Sincerely,
Edgar A. Rossiter
Consulting Engineer
Des Plaines, Ill.

Accidents in Construction And on Highways, in 1949

Out of every 100,000 workers in the construction industry, 77 were killed and 6,600 were injured during 1949. Grim as these figures are—they are re-

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ported by the National Safety Council in the 1950 edition of "Accident Facts"—they represent a slight improvement over 1948, when 78 per 100,000 were killed and 7,050 were injured.

Compared with other industries, however, construction is still low on the list. In accident frequency (disabling injuries per 1,000,000 man-hours) construction ranked 34th in a list of 40 industries. While the mean accident-frequency rate for all industries was 10.14 in 1949, it was 19.48 for construction, except for some only by clay and wood-products, and for the transportation, mining, and lumber industries. In accident severity (incentives in days per 1,000 man-hours) construction was 33rd. The mean accident-severity rate for all industries was 1.02 in 1949; for construction it was 1.02, exceeded only by the cement, glass, and electric-utilities, quarry, and lumber industries.

As for motor-vehicle accidents, in 1949, there were 7.4 deaths per 100,000 miles of travel or 21 per 100,000 population. To put it another way, in 1949 there were 17 times as many deaths and 94 times as many vehicles on highways as in 1910. To put it still another way, if you were to make a minute safety speech, 2 people would probably die in a motor-vehicle accident and 60 people would be injured every you talked!

If you want to get hold of a copy of "Accident Facts", address the National Safety Council at 425 N. Michigan Ave., Chicago 11, Ill. For 1 to 9 copies, 75 cents each; for 10 to 99 copies, 50 cents each; for 100 to 999 copies, 50 cents each; over 1,000 copies, 50 cents each.



"I've great news for you folks. After today you can watch us in the comfort of your own homes. We've got a television sponsor."

Garage for Shoppers In Business Section

Concrete Floors Supported on Steel Framework for 959-Car
Parking Project in Richmond, Virginia

A PARKING project with a 959-car capacity for the convenience of shoppers is being developed in the heart of downtown Richmond, Virginia. A new steel and concrete garage, 260 feet long, fronts the entire block of Grace Street between Sixth and Seventh Streets. It is rectangular-shaped, 163 feet deep, and connects at the rear on three levels to another garage opening on Sixth Street. This existing reinforced-concrete garage, 22 years old, has five stories and a roof for parking purposes. Originally it was designed to accommodate 500 cars, but the ever-increasing length of modern automobiles has decreased its effective capacity to 400 units.

The new garage will hold the remaining 559 cars of the 959 total on its basement, second floor, and roof levels; on the stores, and entrance and exit magazines will be on the first floor. However, the foundation and structural-steel framework were designed and built to support eight stories if the owners decide to enlarge the building at some future time.

For many years the site was occupied by small buildings. These had recently been torn down, and the land was given over to a parking lot. Only one 40 x 70-foot two-story building remained to be razed to make room for the new garage on which construction started in January of 1950. By late fall the basement and first floors were expected to be ready to handle the cars of shoppers for the pre-Christmas buying season. The second floor and roof levels will be completed early this year. The new building will cost about \$1,000,000.

Heavy Foundation

Grace St. Parking, Inc., the owner, having Doyle & Russell, general contractor of Richmond, build the new garage. Excavation to an average depth of 8.5 feet below street grade involved the removal of about 18,000 yards of dirt, including the material dug out for column footings. A ¾-yard shovel handled the bulk of the cut, with a backhoe and clamshell crane helping out on the column-footing excavations. A ramp from Seventh Street went down into the hole for the convenience of seven 5-yard trucks which hauled the material away to a spoil area.

The natural soil, a mixture of hardpan, clay, and sand overlying rock, made good foundation material. Load tests at 6 tons to the square foot developed a settlement of only ⅝ inch after 48 hours. The foundation is designed for an allowable bearing of 10,000 pounds per square foot.

Footings were required for 94 steel columns and 22 concrete columns. Concrete footings for the heavy steel columns average 12 feet 6 inches square x 4 feet deep, and were generally poured in the ground with little forming needed. For the concrete columns the footings are smaller, since they support lesser loads up to the first-floor level only. The basement extends under the sidewalks on the Grace and Sixth Streets with vault-type construction. Of the 22 concrete columns, 13 of them pick up the building wall load along Grace Street, 6 are at the rear of the structure, and 3 others support the main up-ramp.

Concrete Wall

Around the sides of the garage is a

16-inch reinforced-concrete wall, averaging 8.5 feet in height, extending from the basement to the level of the first floor. It helps support the sidewalks where they are laid over the vault sections. Before any excavation was made for the wall, an auger bored a line of 18-inch-diameter holes along the street side of the wall. These holes were 8 to 10 feet deep, and were spaced about 8 feet apart. Into these holes 10-inch steel H-beams, averaging 18 feet long, were dropped.

(Continued on next page)



C. & E. M. Photo

This view shows portions of steel erection completed in sections A and B along the Sixth Street side of the new Richmond garage.



DOMOR

ELEVATING GRADER PUTS OUT

440 LOADS A DAY!

6-12 YARD LOADS IN 35-45 SECONDS!

A DOMOR Elevating Grader mounted on a "Cat" No. 12 Motor Grader — keeps a fleet of 35 trucks on the move near Kentland, Indiana. The DOMOR — owned by Moellering Construction Co. — is stripping overburden from a stone deposit.

35 to 45 seconds after a truck pulls under the fast-moving conveyor, it has a heaped load. There are 50 each hour — over 440 a day!

You, too, can get this amazing production on your jobs . . . whether it be stripping, road-building, terracing, maintenance or other . . . with DOMOR big-production capacity. Ask your DOMOR-"Caterpillar" Dealer to show you a DOMOR Elevating Grader at work . . . there's one near you!

BIG DOMOR FEATURES

KEEP BIG PRODUCTION MOVING

Powered by the economical "Caterpillar" No. 12 or 112 Motor Grader.

Heavy-duty conveyor carries a load at 400 feet per minute.

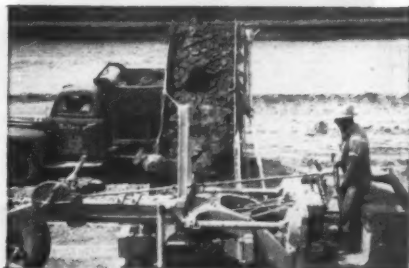
30" disk cuts deep furrow outside the line of the wheels.

Motor Grader controls operate the elevator controls. Material moves on and up the DOMOR conveyor — heaping a load in 35-45 seconds on the Moellering Co. project.



ULRICH PRODUCTS CORPORATION

Reanoke, Illinois



designed for heavy floor loads. A head consists of steel channels backed against each side of a column, with two ends projecting out in each direction for embedding in the concrete floor slabs. Most of the channels are 7 inches deep with legs 2½ feet long out from the columns. In a few instances where 12-inch channels are required, the projecting sections are 3½ feet long. The through channels, into which their companion sections are framed at right angles, are supported beneath by angles welded to the flanges of the columns.

Having the columns fabricated and assembled full length, with heads attached at the shop, simplified the erection but called for special attention in hauling and handling. The steel came by rail from Allentown, Pa., to the Ball Park siding of the Richmond, Fredericksburg & Potomac Railroad, about 2½ miles from the job site. The Tyler Transfer Co. of Richmond hauled the long columns on either flat-bed or pole trailers, taking a maximum of only three or four sections to a trailer.

The flat-bed trailers were cribbed up front and back and also lengthwise with 12 x 12 timbers on which the columns were laid so that the projecting heads were not resting on anything. They were unloaded and erected by a Lorain 75-D crane equipped with a 30-foot boom and a 15-foot jib. While the columns are the free-standing type, to be tied together only by the concrete floor slabs, they were connected during the erection with steel junior beams at the second-floor level. These steel cross beams were only bolted in place. Their function was to keep the columns perfectly plumb until the floor slabs were poured, after which they were removed.

Riveted Structure

Steel permanent beams encircle the outside of the structure at each floor level. For erection purposes the framework was divided into six sections—A, B, C, D, E, and H. Work started with sections A and B along the Sixth Street side of the site, and continued in the direction of Seventh Street where the access ramp led up to street level. The heaviest single member in the garage is an 18½-ton girder, 45 feet long, that frames between a 10-ton and an 8¼-ton column in section C. The girder supports a ramp leading into the adjoining garage, at second-floor level.

It is a box-plate girder, 6 feet 6 inches deep measured back to back of the 6 x 6 x ⅞-inch angles, with two web plates 7/16 inch thick. A truck crane was hired for a short time to help in the erection of the girder.

The 630 tons of structural steel in the new garage contain 2,600 field rivets, of which the 300 in the girder are ⅞-inch size, and the remaining 2,300 rivets are all ¾-inch. The bulk of the riveting was done with a single crew—heater, catcher, buckler-up, and driver—using Ingersoll-Rand riveting guns and an I-R 500-cfm air compressor. They worked on floats hung from the framework. The Lehigh Construction Co. employed a total force of 15 men on the project.

Hard-Surface Floors

The garage contains 10,500 cubic



C. & E. M. Photo

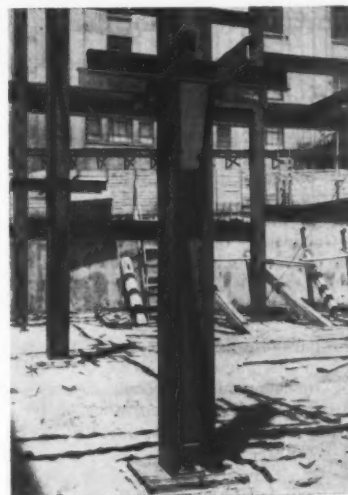
A detail of shoring as it frames into the foundation wall of the garage.

yards of concrete of which 8,000 yards is the lightweight variety used for all slabs above the basement level. Reinforcing steel in the building totals 525 tons. Floor and roof slabs were poured on plywood supported from the floor below with a pattern of 4 x 4 posts, laid out on 4-foot 8-inch centers both ways. On top of the posts went 4 x 6 caps across which were laid 4 x 4 joists on 16-inch centers. The plywood was laid over the joists.

In pouring the upper floor levels, the contractor set up a tower hoist at each end of the building, with a 6-yard receiving hopper at the bottom to take the full contents of a 5-yard truck mixer. The concrete was distributed to the forms by hand buggies. A fleet of five truck mixers kept the job well supplied with material.

The surface of the concrete was screeded off by hand, and in the basement and roof, and part of the first floor topped with an ⅛-inch wearing course of Masterplate floor hardener.

(Concluded on page 87)



C. & E. M. Photo

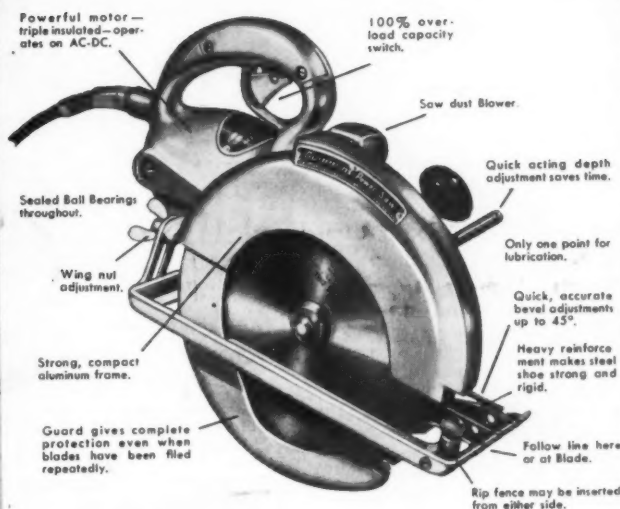
A closeup of a garage column from the base plate at basement level to the column head at first-floor level.

Cummins Power Saws

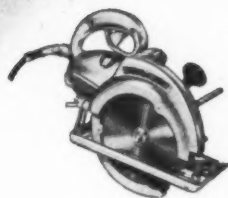
for
**THE
HEAVY
Construction
FIELD**

...FOR every
CONTRACTOR AND
BUILDER
OPERATING
FIELD
CREWS

Cummins Power Saws are specifically designed, engineered and labeled for use in the heavy construction field. For ruggedness, dependability, performance you won't find an equal in these two models to meet all your cutting needs on any major job or engineering project.

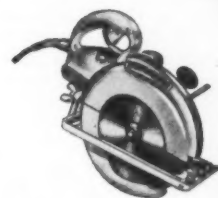


IT TAKES ALL
THESE QUALITY FEATURES IN A
POWER SAW TO STAND UP IN THE
HEAVY CONSTRUCTION FIELD



MODEL 905

CAPACITY: 8" blade; cuts 2½" on a square cut; 2½" at a 45° angle. Blade speed 3600 R.P.M. Base adjusts vertically from ¾" to 2½".



MODEL 1000

CAPACITY: 9¾" blade; cuts 3½" on a square cut; 2½" at a 45° angle. Blade speed 3400 R.P.M. Base adjusts vertically from 1" to 3½".

FOR LEASE

2 Manitowoc #3500 Series Stripping Shovels
45' Booms
34' Sticks
2-Yard Buckets equipped.
Will convert to crane work for customer's specifications
1—28 Northwest Draglines
Will convert to crane.
1—D-7 Cat Dozer
1—D-8 Cat Dozer
1—22 ½-Yard Bucyrus-Erie Shovel
1—500 cu. ft. Gardner-Denver Air Compressor complete with 2 Wagon Drills.
3—Euclid Dirt Movers.
All above equipment Diesel operated. Available for immediate long term rental.

CUMBERLAND COLLIERIES, INC.
960 North Pennsylvania Street
Indianapolis, Indiana
Lincoln: 6323



Cummins

PORTABLE TOOLS

DIVISION OF CUMMINS - CHICAGO CORPORATION
4740 NORTH RAVENSWOOD AVENUE • CHICAGO 40, ILLINOIS
IN CANADA: CUMMINS PORTABLE TOOLS, 33 Church Street, Toronto, Ontario

ASK YOUR JOBBER... ASK YOUR JOBBER... ASK YOUR JOBBER... ASK

Garage for Shoppers In Business Section

(Continued from preceding page)

This was put on in two applications. It is made up of iron filings and cement, and imparts a hard wearing surface to the floors. The second floor has a 2-inch bituminous topping.

Concreting operations also included the encasement of all structural-steel members with a 2-inch covering of concrete as protection against fire. The outside walls are brick. Entrance to the garage is off Grace Street through a spacious magazine 75 feet wide with an up-ramp at the back. Stores at street level flank the entrance on both sides. An exit goes out to Sixth Street.

Personnel

Doyle & Russell, general contractor, employed an average force of 90 on the construction.

The garage was designed by Carneal & Johnston, architects and engineers, of Richmond, with Ramp Buildings Corp., of New York City, the planning consultant. Edward E. Ashley of New York was consulting engineer, and William Adkinson represented the architects on the construction.

The parking project will be operated by National Garages, Inc., consultants-operators, which is owned by Miller-Rhoads and Thalheimer Bros., two of Richmond's largest department stores and close by the new garage.

Load-Transfer Principle Applied to Towing Tractor

A new 12-page brochure about the load-transfer principle as applied to towing-type tractors is offered by M-R-S Mfg. Co., Box 336, Flora, Miss. The patented M-R-S weight-transfer device consists of a hydraulic cylinder mounted at about a 45-degree angle between the tractor drive axle and the front of a Mississippi wagon or scraper. When extra weight is needed on the tractor drive wheels for added traction, the cylinder is energized and pushes up on the front of the trailer or scraper, resulting in an equal downward force on the tractor drive axle.

The booklet points out that this causes a transfer of weight from the front axle of the trailing vehicle, thereby lifting a portion of the trailer and payload weight from the trailer front axle and placing it on the tractor drive wheels. The cylinder normally floats free and is used only when extra traction is needed for rough going at slow speeds in first and second gear.

Catalog No. 200 uses photographs and diagrams to show how weight transfer works. It also outlines the features, specifications, construction details, and applications of the M-R-S Model 125A towing-type tractor and the Mississippi Wagons, available in six different models, the largest with a struck capacity of 13 cubic yards and a heaped capacity of nearly 20 cubic yards. A number of on-the-job photographs illustrate M-R-S and allied equipment in land preparation, dirt-moving, road maintenance, and hauling work.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 594.

Changes at Caterpillar

Caterpillar has created a new sales division to be known as the Plains Division. It will be made up of territory formerly under the Central Division, which will take over part of the Eastern Division. Kenneth F. Ames will be its Sales Manager, with Lee Morgan and Gordon Fowler as Assistant Sales Managers.

In the Western Division, former district representative E. A. Tiarks is now Assistant Sales Manager. In the Eastern Division, W. F. Jordan, also a for-

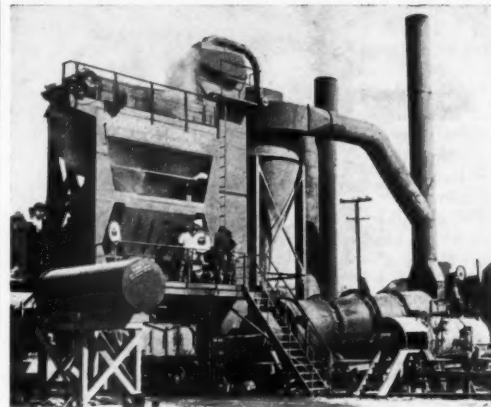
mer district representative, is Assistant Sales Manager.

The Engine Sales Department is now operating as the Industrial Division of the General Sales Department, under H. H. Howard, Director of Sales, and with H. W. Smith as Division Manager.

Bearing-Maintenance Data

The first issue of the AFBDA Bearing Maintenance Report—designed to grow with succeeding issues into a valuable handbook and reference guide on the subject—has been announced by The Anti-Friction Bearing Distributors Association, 1900 Euclid Ave., Cleveland 15, Ohio. These pamphlets will report on a continuing study of bearing-maintenance techniques and successful maintenance, installation, and removal procedures.

A file-type binder and a copy of the first and succeeding issues of the report may be obtained from the Association by requesting it on your company letterhead.



STANDARD is one of the oldest and largest builders of paving plants—many types in all conditions. Used throughout the world. Modern, Unit-built, easy to erect and transport.

Write for free catalog

STANDARD STEEL CORP.

5007 Boyle Avenue
Los Angeles 58, Calif.

STANDARD

presents
"Model SM"
Black-top
mixing plant

"America's
Newest and
Finest"

EXCAVATE...

DIRT CHEAP

WITH TRAXCAVATOR!

Digging basements for new homes in Winston Salem, N. C., is this T4 TRAXCAVATOR — D4 Tractor team owned by L. A. Reynolds Co. The surefooted TRAXCAVATOR excavates to exact grade, hauls dirt up a ramp and loads trucks. The company owns three other T4-D4 teams.



If you're excavating on contract, trim your bid with TRAXCAVATOR cost-cutting performance!

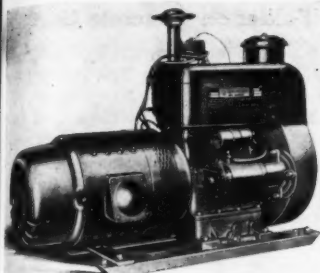
TRAXCAVATOR's versatile, one-man operation digs dirt cheaper! Easy precision control minimizes expensive hand labor, for TRAXCAVATORS hold accurate level grades and cut clean vertical walls. And a TRAXCAVATOR keeps busy — excavating, loading, stock-piling, grading, dozing, spreading, removing snow — keeps busy for less!

Lost time is reduced — for each load is a heaped load in a TRAXCAVATOR's easier loading bucket . . . any ground condition is a fast track for TRAXCAVATORS on the haul . . . fast, positive dumping action gets rid of all the material — quicker . . . built-in balance between TRAXCAVATOR and tractor keeps cycle-time clipped . . . keeps dirt cheap!

You can meet any contract . . . any job condition with a TRAXCAVATOR and still hit the profit jackpot. Ask your TRACKSON—"Caterpillar" Dealer about other TRAXCAVATOR advantages . . . about the five sizes available (from 1/2 to 4 cubic yard capacity) . . . about the service that backs them and keeps them working . . . about the low-cost of TRAXCAVATOR excavating. He can give you full details . . . or write direct to TRACKSON COMPANY, Dept. CE-31, Milwaukee 1, Wisconsin.

TRAXCAVATOR®

The Original
Tractor Excavator



Seven sizes, 300 to 10,000-watt, and various models in each size constitute the new G-line of electric plants made by the Winpower Mfg. Co.

Electric-Plant Line

A new line of electric plants has been announced by the Winpower Mfg. Co., Newton, Iowa. Known as the G-line, these plants will be available in 300, 600, and 1,000-watt capacities with Briggs & Stratton engines, and in 1,500, 3,000, 5,000, and 10,000-watt sizes powered by Wisconsin engines. Designed for continuous and standby duty, they feature a simplified design.

Various models are available in each size, in ac or dc, with a complete range of voltages, cycles, and phases, and with manual or remote electric starting. Each model is shipped as a complete package, ready to connect and operate.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 585.

Clean Cooling Systems

Looseleaf-type data sheets on products designed to insure clean cooling systems in automotive equipment are offered by Motor Kool Products Co., Inc., 505 Buttles Ave., Columbus 8, Ohio. The principal products described are Powerflush and Rustrite, for treating cooling systems on heavy-duty equipment.

Powerflush is a nonacid dry product which dissolves grease, washes away lime, and throws rust into solution. It can be poured directly into the radiator and allowed to do its work while the equipment is on the job, being left in for a full day if necessary, the company says. Rustrite removes rust from water and is said to prevent further formation for approximately one year. These and the other products are described; tables of quantity, and sizes available are included.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 652.

Earth-Moving Attachments

The new engine-mounted hydraulic bulldozers, Graders, and rippers manufactured to match the new line of Allis-Chalmers HD-20, HD-15, HD-9, and HD-5 tractors are described in Engineering Bulletin No. 894, released by The Baker Mfg. Co., Springfield, Ill.

Features of the new engine-mounted models are described as direct lift, positive down-pressure, mobile moldboard, fingertip control, positive hydraulic hold, and easy engine accessibility. Specifications list the weight, length of vehicle and blade, length and height of moldboard (or teeth), depth of cutting edge, lift above and drop below ground, maximum track-shoe width, maximum blade tilt, minimum and maximum blade angle—and for the rippers, number of teeth, teeth spacing, and length of teeth below frame.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 617.

Ryerson Elects Officers

The Board of Directors of Joseph T. Ryerson & Son, Inc., Chicago, has elected Charles L. Hardy President of the company. He replaces Everett D.

Graff, now Chairman of the Executive Committee. Thomas Z. Hayward was elected Vice President in Charge of Sales. Mr. Hardy and Mr. Hayward were also made directors and members of the Executive Committee.

Mr. Hardy, formerly Assistant to the President, joined the Ryerson Boston plant organization in 1927. Mr. Hayward has been with Ryerson since 1917, and before the recent election he was General Manager of Sales.

Data on Compaction Tampers

A new 4-page folder on tamping rollers has been offered by William Bros. Boiler & Mfg. Co., 1057 10th Ave., S. E., Minneapolis 14, Minn. It highlights the standard Sheepfoot tampers and the tapered Diamond foot tampers.

The six medium-weight M Series models are available in single, double, and triple-drum combinations. Foot pressures for these units range from 108 to 315 psi. All six models have 112 feet per drum, with foot surface areas

of 5 or 7½ square inches, as required by the user. The G Series Diamond-foot tampers are available in four different models in both single and double-drum types. These heavier units provide foot pressures of 296 to 740 psi. The folder illustrates each of the

series and provides complete specifications on all models. Working details and closeup details of the foot designs are included.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 580.

LANSING F4-1/2 WHEELBARROW

The most popular wheelbarrow on the market for handling wet concrete. Ask your dealer or write direct to Lansing or one of our warehouses.



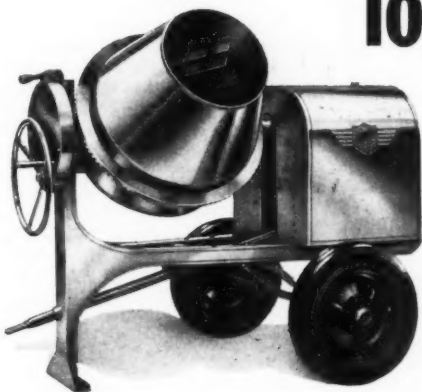
LANSING COMPANY
LANSING, MICHIGAN

Builders of wheelbarrows for over 68 years

Chicago, Ill., 1535-1537 S. State Street
Kansas City, Mo., 1413-1415 W. 11th Street
Philadelphia, Pa., Cor. N. American & Willow
New York, N. Y., 28-30 Vandam Street

Minneapolis, Minn., 326 N. First Street
San Francisco, Calif., 338-348 Brannan Street
St. Louis, Mo., 78 Cambridge Street

are you a half-wheelbarrow loser?



Essick "Big Boy" Model 62B Side Discharge Concrete Mixer. Also available in Model 62C End Discharge; both models mix a two-barrow batch.

Regardless of how you are now mixing concrete—by hand or half-sack mixer—the Essick "Big Boy" can save you a surprising amount of job-time and labor costs.

Four specially designed steel blades shovel material the full length of the elongated steel bowl, resulting in a fast, thorough mix.

Heavy duty engine, air cooled, Timken bearings, equipped with rotary magneto and impulse coupling for easy starting.

Low center of gravity, cantilever springs and industrial pneumatic-tired wheels assure safe, easy trailing.

**YOU CAN DEPEND ON ESSICK EQUIPMENT
—PROVED IN USE FOR 28 YEARS!**



MIXERS



PUMPS



HOISTS



ROLLERS

Essick Manufacturing Co.
Los Angeles 21, California
Sales & Service—Coast to Coast

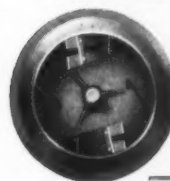
ESSICK



Conventional 3½-S half-sack concrete mixers make only a barrow and a half per batch, but an Essick "Big Boy" mixes two full barrows of concrete each time! Workmen can deliver two full wheelbarrow loads in the same time it takes to haul the fractional 1½ barrow batch. Therefore, mixing concrete in 3½-S half-sack mixers can cost you hundreds of dollars in lost labor time!

Contractors everywhere who now use the "Big Boy" praise its two-barrow batch capacity and find that this unit actually makes up to 50% more concrete per day than half-sack mixers.

Essick mixer Model 350 mixes a one-barrow batch;
Model 93 mixes a three-barrow batch.



Electrically-welded, guaranteed unbreakable steel bowl. Equipped with Essick quick-mixing steel blades.



Mixing bowl fits over extra strong steel king pin and rests on adjustable Timken bearings.

Adjustable Timken roller bearings support jack shaft.

Mail coupon today for more information about Essick Concrete Mixers that will save you job time and labor costs.

TO: ESSICK MANUFACTURING COMPANY, DEPT. CEM-3
1950 Santa Fe Avenue, Los Angeles 21, Calif.

Please send me more details about your Concrete Mixers.

I am interested in a machine that mixes a _____ one barrow batch.
_____ two barrow batch.
_____ three barrow batch.

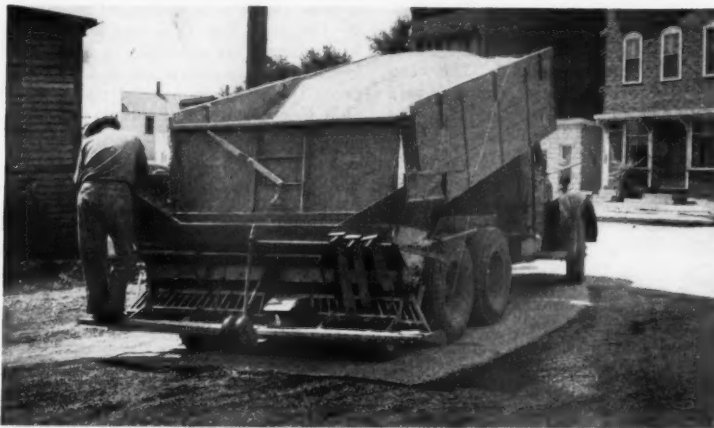
I am also interested in other Essick equipment: _____ (PLEASE NAME)

NAME _____
COMPANY _____ TITLE _____
ADDRESS _____
CITY _____ STATE _____

New Self-Contained Aggregate Spreader

The Even-Seal spreader, a new self-contained hopper-on-wheels unit for all seal and cover-coat spreading, has been announced by Flink Co., Streator, Ill. It features uniform, fast spreading either backward or forward, with forward speeds up to 20 mph.

The company claims that spillover, back or side, is not possible and that the material will flow all of the way across the hopper without shoveling. The spreader handles wet sand as well as all free-flowing materials. Width of spread is from 2 feet 6 inches to 11 feet 3 inches and can be adjusted while the spreader is operating. Blockoff plates work from either side and can be inserted and adjusted whether the hopper is empty or full. One lever operates the volume-control gate across its full width, or the gate divides in two half sections, each lever-controlled. The spreader can be attached to any dump truck equipped with a universal or



The Even-Seal spreader attaches to any dump truck equipped with a universal or Flink hitch. Width of spread is from 2½ feet to 11 feet 3 inches.

Flink hitch, by means of individual self-locking hitches. The truck does not have to be in line with the spreader to connect; spreader is self-aligning.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 603.

A Catalog of Filters For Engine Protection

A new catalog on Fram oil, air, and fuel filters for engine protection is offered by Fram Corp., Providence 16, R. I. The Fram filter cases and cartridges, the company points out, are designed for use on almost all truck, tractor, industrial, and marine engines. The catalog features tables which indicate the recommended filter or installation kit for each and every engine model. It gives additional data on the construction and parts of these units.

Also available from Fram is a catalog presenting a new radiator and water cleaner designed to end cooling-system troubles. According to the company, this filter will soften hard water, thereby preventing scale deposits; inhibit corrosion and prevent rust; and filter and remove all solid particles from the liquid.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 605.

Rugged Diamond-Core Drill

A new bulletin describing the Joy 22 HD heavy-duty diamond-core drill has been put out by the Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22, Pa. This unit is a 2,000-foot-capacity drill which may be powered by gasoline, electricity, or compressed air. It mounts on a truck, steel skids, or underground column.

The catalog illustrates and describes all features of the machine, its application in the field, its mounting, and construction.

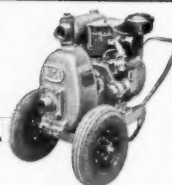
This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 573.

Euclid-Hibbing Branch Moves

The Minnesota sales and service branch of the Euclid Road Machinery Co. has moved to a new building on Highway 169, W., in Hibbing. Manager J. W. Bloomquist, Service Manager Otis Hadlock, and D. R. Anderson, who has charge of parts, welcomed visitors to the new warehousing and servicing building at a reception in January.

RICE

Self-Priming
CENTRIFUGAL
PUMPS



Engine, belt, and electric driven pumps with many new features to give you outstanding performance at low cost. A.G.C. rated. Write for special bulletins.

RICE PUMP & MACHINE COMPANY
220 N. Milwaukee St. Grafton, Wis.

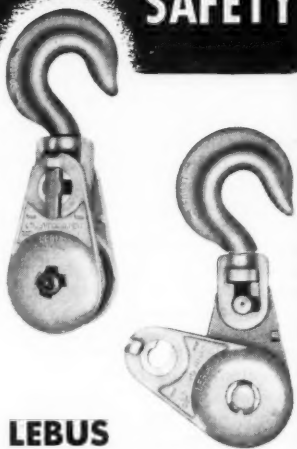
Folder on Concrete Gun

A 4-page folder on the Prehy Concrete Gun is offered by The Prehy Co., 420 Lexington Ave., New York 17, N. Y. Features claimed for this unit are its sturdy construction, continuous and economic operation, and accurate work control.

For the benefit of those not familiar with this equipment, the company points out that the Concrete Gun is a machine by which a mixture of cement and sand or other cementitious materials is forced by compressed air through a hose to a nozzle, where water brought through a separate hose is added, the combined materials being driven forcibly from the nozzle. The resulting product is gun-applied concrete or Guncon. Illustrations, and a complete description of the construction and features of this unit are included.

This literature may be obtained from the company by requesting Catalog No. 2, or by using the Request Card at page 16. Circle No. 564.

**Built for
SPEED &
SAFETY**



LEBUS
ALL-PURPOSE
SNATCH BLOCKS

- EASILY ASSEMBLED or disassembled in difficult places
- Line can be inserted easily in any difficult position
- No tools needed for assembly or disassembly
- Can be used with either wire line or manila rope
- No Accidental opening by jarring or vibration
- No losing of parts
- No threaded nuts or bolts to burr, foul or loose
- No sparking danger around gas or oil

The LeBus Snatch Block may be readily adapted for all purposes through its complete interchangeability of parts. It is completely drop forged of alloy and high carbon steel and is thoroughly heat treated for strength and durability. LeBus Snatch Blocks are given the full strength test before leaving the plant and are fully guaranteed.

"BUY FROM YOUR SUPPLY STORE"

LEBUS

WRITE
FOR
BULLETIN

LEBUS
ROTARY TOOL WORKS
INCORPORATED

P. O. Box 2352 L. D. Ph. 5
LONGVIEW, TEXAS



HELTZEL
SUPERIOR *Batching*
Plants

• More efficient batching plants will effect savings for you in operation and plant costs. Heltzel's specialized engineers work out your specific problems on both stationary and portable installations, ranging in capacities from 30 to 500 tons. Why not let a Heltzel representative explain exclusive features and Heltzel's better construction.

• Recirculating cement system—fills sealed cement compartment (right), and then automatically switches to loading of storage tank.

• 1000 bbls. capacity cement storage (others 600 to 2000 bbls. optional) assures continuous operation of plant

- CENTRAL MIX PLANTS
- TRANSIT MIX PLANTS
- BULK CEMENT PLANTS (Portable and Stationary)
- AGGREGATE BATCHING PLANTS (Portable and Stationary)
- CONCRETE BUCKETS

• Ohio Conveyor system—stock-piles aggregates and loads bin with one elevating conveyor and one tunnel conveyor. Diverters unload incline conveyors to stock piles at any specified points.

• Heltzel batchers, automatic or manually operated, are designed for speedy operation and uninterrupted service. Complete plants, including conveyor systems, are Heltzel designed and built for uniform quality.

• Trouble-free cement valves, exclusive with Heltzel, at all cement discharge points assure smooth flow through narrow passages.

HELTZEL STEEL FORM & IRON COMPANY
WARREN, OHIO, U. S. A.

Please send information regarding:

Stationary Batching Plants ☐ Road and Airport Forms ☐
Portable Batching Plants ☐ Curb and Gutter Forms ☐

FIRM _____
ADDRESS _____
CITY _____ STATE _____
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WRITE FOR
BULLETIN

HELTZEL STEEL FORM & IRON CO.
WARREN, OHIO • U. S. A.

Snow Comes Suddenly To Idaho Panhandle

Advance Warning Usually Missing, so Equipment and Men Stay Geared to Meet Sudden Snow Emergencies

LAST fall a full string of new snow-removal equipment rolled into the Coeur d'Alene yard of the Idaho Bureau of Highways. It was the last word in modern machinery. Two men, sitting in the administration building, saw the units roll in.

"There they come," said District Engineer R. M. Parsons to Harry Hubbard, his maintenance engineer.

And as both men walked out into the yard, both were thinking privately, "What happens now? Does this new equipment rust for lack of work, or do we beat it to pieces like we did last January?"

The nightmare of January, 1950, still acute in the memories of men who fought it through, illustrates the difficulty of snow removal over the 600-mile highway system in the Coeur d'Alene district. It is so close to the Continental Divide that weather is next to impossible to predict. Snowstorms come with devastating suddenness.

It was Friday, January 13. For two days the weather had been deceptively mild, but now the gray clouds thickened as the temperature skidded down and down. At noon the snow began to fall. Hubbard checked his men and equipment. About 40 two-ton push plows were ready to go. A 10-ton Marmon-Herrington with V-plow and wings was ready. So was the 8-ton FWD, with V and wing equipment, and two 4-ton FWD's with V's and wings. The V-plow operators—Sammy Ferraro, Volney Fuller, Marvin Amell, and Kenneth Yeoman—waited with the certain knowledge that they would soon be in action.

By 4 p. m. it was down to zero, the snow was so thick men could hardly see, and the wind was howling a gale. Out on Rathdrum Prairie north of Coeur d'Alene bad drifts had already begun to form. Less than 2 hours after the storm began, the situation, so far as push plows were concerned, was out of hand. The big V's went into action.

And then, as night fell, the first disaster reports began to come in. A school bus, loaded with 17 children, was lost somewhere on Rathdrum Prairie. Frantic parents burned up the wires to Parsons' office. Quickly he and Hubbard dispatched a Snogo rotary plow to search for the bus. It was destined to stay out continuously for 30 days, working operators Larry Reagan and Richard Meyers harder than they ever had worked before.

Nobody knew which route the bus had taken. School districts were being so rapidly reorganized that accurate schedules were impossible to get. Reagan began to bruise through the drifts where he thought the bus would be. It became practically impossible to see. At 8 that night he found the bus, with all children safe and warm. Fortunately, the heater was still working in the bus.

Every piece of equipment in the district was at work by midnight, although push-plow operation was no longer very effective. At Post Falls an underpass drifted shut, and 250 marooned people spent the night in a stone church. Again, fortunately, there was fuel to burn. At still another location, 16 people were to stay marooned at a farmhouse for a whole week.

The storm grew worse. In spite of all effort, they began to lose the roads. They didn't have the 250-watt Link radio transmitter and the receiving sets they now have, so it was impossible to

trace equipment unless the operators called in to headquarters. Throughout the night Hubbard and Parsons coordinated the fight and answered the telephone. It was hopeless. The morning of January 14 came, and every road in the district was lost, with the exception of U. S. 10 east of Coeur d'Alene.

On the 14th, high winds became worse, and visibility got so bad the equipment operators couldn't see to work even in the daytime; 60-mph gusts drifted the snow worse and worse.

(Concluded on next page)



C. & E. M. Photo

District Maintenance Engineer Hubbard and District Engineer Parsons (seated) look through their diaries with grim amusement as they remember all too well the snow and bitter weather of January, 1950.

TURN YOUR PROBLEMS TO PROFITS

MIXERMOBILE EQUIPMENT

2-YD. MIXERMOBILE Model M-7

This complete mobile concrete mixing and elevating plant eliminates costs of hauling and erecting expensive equipment. One man handles the entire operation—quickly "sets-up" ready for pouring... then controls every operation from dump truck to deck.

- Improved batch-timer and counter insures uniform mix.
- New electronic water meter gives unerring accuracy.
- Sturdy planetary drive hoist clutches.
- Mixes up to 50 yards per hour.
- Portable elevating and agitating storage plant for ready mix.

DUO-WAY SCOOP

Power-packed dozer at one end... scoop at the other. The Duo-Way is designed for top performance. Unit with 84-inch dozer blade, optional, at one end, and 1 cu. yd. scoop at the other end performs four operations—loader, dozer, truck and tractor.

- Dozes out, then scoops up dirt, lifts, transports and loads.
- Operator in sidesaddle seat has perfect vision and control.
- Rugged planetary drive for "extra" power.
- Improved hydraulic-controlled track and dozer.
- Complete assortment of attachments for versatility.

Write for literature and address of your nearest dealer.

We reserve the right to make improvements in design and specifications without notice.

MIXERMOBILE MANUFACTURERS

BOX 7527 PORTLAND 20, OREGON

Snow Comes Suddenly To Idaho Panhandle

(Continued from preceding page)

Hubbard had to give the order to shut down snow removal, but operators stood by nevertheless to do what work they could between blizzards. Temperatures stayed down. It was below zero January 17, 18, and 19 . . . and it was destined to drop to 32 below shortly after the snow battle was over.

For 10 days after the storm broke, men and equipment fought. After several days the wind slowly abated. Then the big rotaries began to make progress again. Finally the V's could work again, and one of the worst storms ever to come to northern Idaho was whipped.

Big Snow-Removal Organization

So tricky is the snow problem in northern Idaho that the District maintains a large organization to cope with the problem. Removal costs run about \$336 per mile per year. In addition, ice is such a problem that sanding is done extensively.

Rotary plows include a large Snogo on Lookout Pass, east of Wallace; a medium Snogo at Coeur d'Alene; and a shop-built sidewinder. Two new Oshkosh 10-ton machines with V-plows and wings joined the V-plow fleet a short time ago. There are now 6 large V-plows in the district, and 40 push plows.

Two sanding machines in Bonners Ferry, 2 in Mullan, and a lot of hand labor take care of the ice problem. A few carloads of cinders are available each month from the railroad yards at Mullan, but for the most part sand is used to improve traction on icy roads. Salt-treated sand is now being used.

One of the most valuable snow-removal assets is Radio Station KVNI, at Coeur d'Alene. Manager Burl Hagadone is always happy to cooperate with the Highway Department by broadcasting emergency warnings and other vital information about highways. The station has been of invaluable help in reducing nonessential traffic during the bad storms. Under ordinary conditions, northern Idaho roads remain open to traffic throughout the winter.

Main transcontinental routes through the district are U. S. 10, 10 Alternate, 95, and 2. They, of course, get the highest snow-removal priority. Then come the state secondaries, and farm-to-market roads.

Radio communication, installed last year, is already simplifying the snow-removal job. Eight 35-watt receivers are now in operation in key cars and equipment. More are to be added.

It should not be too long before men like Operator Dominic Garitone, who runs the Snogo at Lookout Pass, can work in much closer touch with Hubbard and Parsons as they direct one of the worst snow areas in the west.

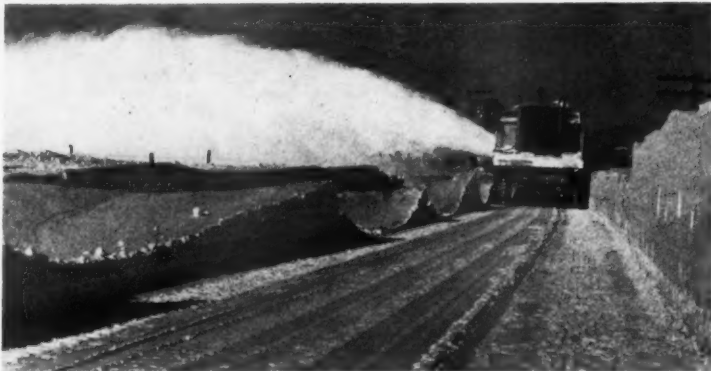
Data on Types of Locknuts

An 18-page bulletin on types of locknuts and their principles of operation has been prepared by the Locknut Section of the Industrial Fasteners Institute, 3648 Euclid Ave., Cleveland, Ohio. It points out that an important consideration in the selection of a locking device is the ease and speed of assembly. It then presents a detailed description and illustrations of all modern types of locknuts.

This literature may be obtained from the Institute, or by using the Request Card at page 16. Circle No. 689.

Nine Named to Sales Posts

Nine division managers have been named to direct the sales activities of Fruehauf Trailer Co.: E. C. Henning, Oakland, Calif.; R. D. Mains, Chicago, Ill.; R. B. Hollingsworth, Charlotte,



Idaho Department of Highways Photo

This Snogo played a major part in the Coeur d'Alene, Idaho, snow battle of January, 1950—one of the worst storms in that section in many years.

N. C.; R. H. Montgomery, Omaha, Neb.; Paul G. Secoy, Pittsburgh, Pa.; N. A. Carter, Jr., Memphis, Tenn.; Earl E. Wright, Denver, Colo.; A. G. Russ, Fort Wayne, Ind.; and A. V. Tice, Los Angeles, Calif.

N. A. Carter, Sr., Fruehauf Vice President at Memphis, has assumed active charge of sales development in an 8-state region: Arkansas, Louisiana, Mississippi, Alabama, Texas, Oklahoma, Tennessee, and Kentucky.

Pile-Driving Operator Is 1950 Biggest Liar

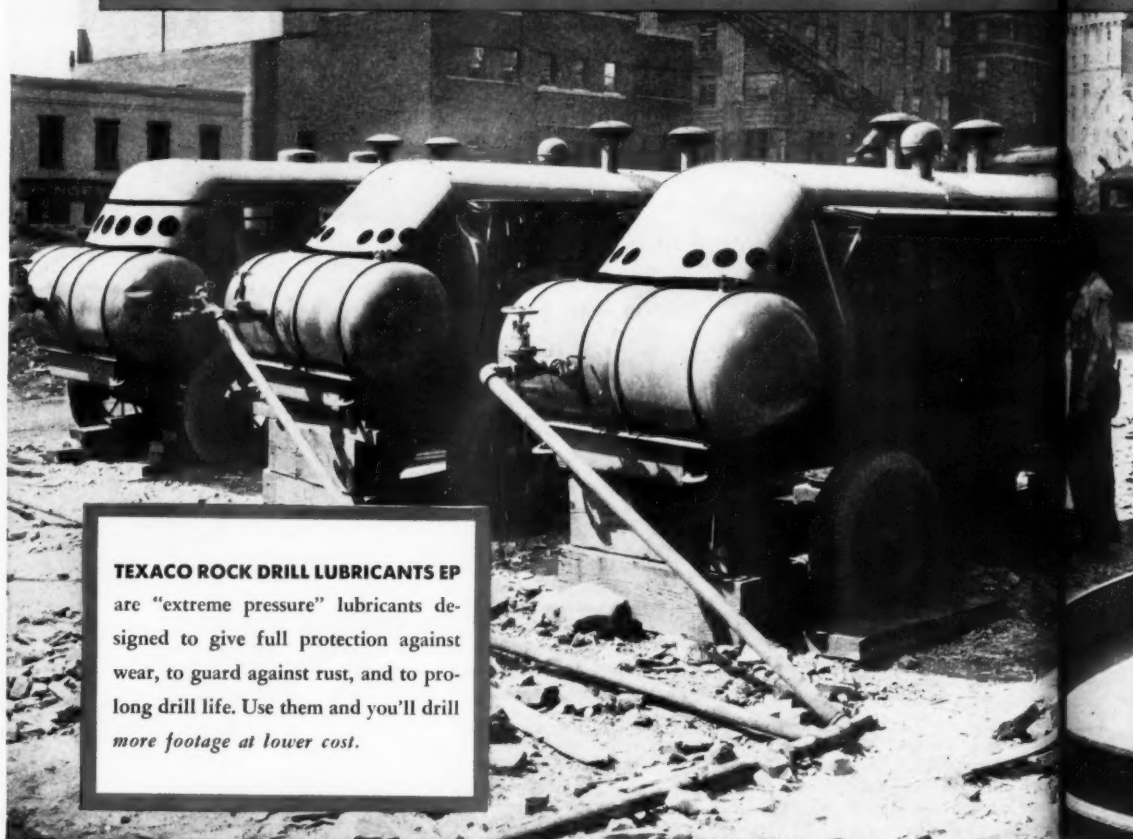
We note with interest that a pile-driver operator, a Californian too, was crowned last December in Burlington, Wis., as the world's champion liar of 1950. The Burlington Liars' Club picked this one by Frank J. Goulette of Los Angeles from a pack of lies submitted from all over the nation and from foreign lands:

"While I was working on a pile driver in North Dakota it got so cold that one night a member of our crew froze to death in bed.

"The ground was frozen so hard that it was impossible to dig a grave. In fact, we never did find out how far down it was frozen. But this I do know—seeing we couldn't dig a grave, we stood the fellow on his head under the pile driver, and we had to drive on him seven days and seven nights before we got him down far enough for a decent burial."

Match that one if you can.

IMPROVE YOUR COMPRESSOR P



TEXACO ROCK DRILL LUBRICANTS EP are "extreme pressure" lubricants designed to give full protection against wear, to guard against rust, and to prolong drill life. Use them and you'll drill more footage at lower cost.

TUNE IN . . . TEXACO presents MILTON BERLE on television every Tuesday night. METROPOLITAN OPERA radio broadcasts every Saturday afternoon.



TEXACO

Jet-Type Blowpipe Can Cut Into Rock

A new jet-piercing hand-held blowpipe developed by The Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y., may be used for shallow "drilling" in secondary blasting operations. The FSJ-1 was able, in experimental testing, to "drill" holes 5 to 9 feet deep in siliceous rock.

The new tool weighs 17 pounds and is constructed of a 70-inch stainless-steel tube with a heavy copper nozzle and a sliding aluminum shield. In operation, the high-velocity high-heat flame ejected from the nozzle causes the rock particle to spall and be blown away. Kerosene fuel, water, and oxygen are fed through the nozzle to provide the cutting action. Though the supply units for these blowpipes are not manufactured by The Linde Co., typical setups are given in diagram form in the instruction manual furnished with the blowpipe.

Since the cutting ability of the blow-



This manual blowpipe directs burning gases, at temperatures of 3,000 to 4,000 degrees F., against rock at a supersonic velocity and "drills" holes to a depth of 5 feet. Linde makes the Jet-Piercing blowpipe for piercing blast holes in rock quarries.

pipe is limited by the spallability of the rock, Linde so far recommends its use only in siliceous material. The need

for an adequate supply of water on site, and ventilation problems in confined quarters are other limiting fac-

tors. Though this unit is still in initial stages of development, it has, when working under favorable conditions, demonstrated itself to be economical, the company says.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 559.

Stoldt Succeeds Bailey As Oklahoma Road Chief

After four years as Oklahoma Director of Highways, H. E. Bailey has resigned to become General Manager of the 88-mile Oklahoma City to Tulsa Turnpike that went into construction in December. C. A. "Bud" Stoldt succeeds him as Highway Director.

During Mr. Bailey's term of office, the State's highway construction program reached an all-time high of 5,356 miles, including 827 bridges, contracted for \$94,549,578. He has also served as City Manager of Oklahoma City. The turnpike he will now manage was begun on December 20 just 12 days before the time limit set by law.

Mr. Stoldt served as City Engineer of Blackwell, Okla., for 10 years. In 1948 and 1949 he was Contract Manager for Patti-McDonald-Manhattan on the \$10,300,000 VA hospital at Little Rock, Ark. Since last October he has been the company's Project Manager on the Army Engineers Arnold engineering development at Tullahoma, Tenn., a defense project. Following his election as Highway Director he announced he would keep the Highway Department intact. Stoner K. McLelland will continue as Chief Engineer.

On Pipeline Equipment, Materials, and Supplies

A 70-page catalog on pipeline equipment, materials, and supplies is offered by M. J. Crose Mfg. Co., Inc., 2715 Dawson Road, Tulsa 8, Okla. Cataloging everything from the large pipe-cleaning, priming, and wrapping machines down to the smaller but still important items such as spades, brushes, and pouring pots, this brochure illustrates, describes, and gives specifications for each product.

The Crose cleaning and priming machines are available in a number of models and are designed for pipes with diameters to 36 inches. The traveling coating and wrapping machines will also handle pipe to this size. Of special interest to pipeline contractors and others with horizontal boring problems is the Crose auger-type under-road boring machine for installing and casing pipe up to and including 34-inch diameters. Among the other equipment described in the catalog are pipeline kettles, flexible metal tar and asphalt hose, wrapping materials, pipeline belt slings, cradles, internal alignment clamps, pipe-cutting and beveling machines, pipe expanders, and portable tools for grinding, welding, buffing, etc.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 608.

Progress in Wood Research

In a new pictorial brochure, "Progress—Through Wood Research for National Defense and Industry", the Timber Engineering Co., 1319 Eighteenth St., N. W., Washington, D. C., has incorporated many of the significant advances that have been made in wood utilization and quality control during the last decade.

The 16-page illustrated booklet presents a concise report of the improvement of existing products, the development of new products, the perfection of wood-working techniques, and the training of technical personnel in the practical aspects of wood research.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 688.

YOUR PERFORMANCE

... by using the TEXACO AIR COMPRESSOR OILS designed for YOUR operating conditions

DIFFERENT air compressor operating conditions give rise to different operating problems—each of which calls for a special type of oil. By using the proper Texaco air compressor oil, you can overcome *your* difficulty, assure efficient compressor operation, reduce wear and maintenance costs. For example—

1. TO OVERCOME RUST, use Texaco rust-inhibited air compressor oils. They keep compressors and systems rust-free whether running or idle.
2. TO OVERCOME CARBON AND GUM, use Texaco heavy-duty air compressor oils. They have special detergent properties and are highly oxidation-

resistant—will keep compressors clean under extreme operating conditions.

3. TO OVERCOME "WET CYLINDER" WEAR, use Texaco compounded air compressor oils. They resist the washing effect of moisture of condensation.
4. TO OVERCOME "NORMAL" OPERATING DIFFICULTIES, use Texaco straight mineral air compressor oils. They assure clean operation and reduce wear.

Your Texaco Lubrication Engineer will gladly help you select the right oils to assure you the most efficient compressor operation. Contact him through the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd St., New York 17, N. Y.

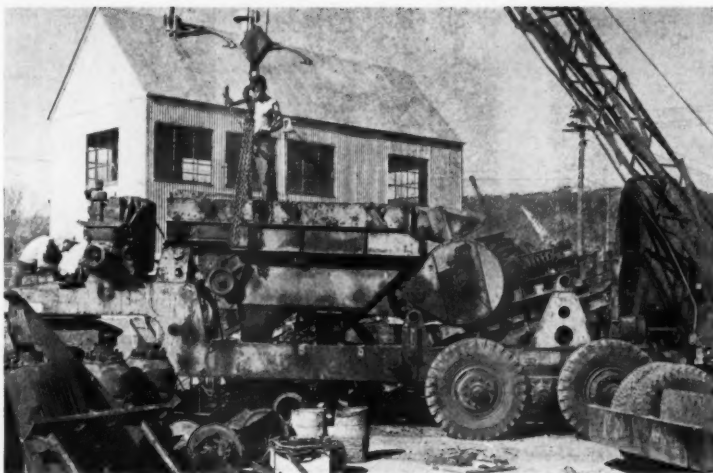
Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

Crusher Off Again On Its War Career

A two-unit Cedarapids crushing plant built by Iowa Mfg. Co. employees in commemoration of Louis M. Parks, the company's first World War II casualty, is on its way to action again after having been repaired at the Cedar Rapids factory.

The crushing plant, christened "The Spirit of Cedarapids", was built by parts donated by the company and 8,000 man-hours of work donated by the employees. It was given to the Army in December, 1943. The company asked that it be informed on the plant's whereabouts and performance at 30-day intervals if possible. For a while reports came in regularly from the China-Burma-India Theater. At the engineer depot in Assam, the equipment was assigned to an aviation-engineer unit working on the Ledo Road. Later it was shipped up the road with the first overland convoy to go into the jungles of Burma, and reports came in telling of



The secondary of the two-unit Cedarapids crushing plant, which was given by Iowa Mfg. Co. and its employees to the Army seven years ago, is reconditioned at the factory. The machine played an important part in building roads and airports near the Burma road in the CBI Theater, and it was also used at Lingayen Gulf, in the invasion of the Philippines.

the part it played in providing all-weather roads and airstrips along the "Hump". After a letter placing the crushing plant in the Philippines, the reports stopped coming, and no one at Iowa knew what had happened to it until last October. Then surprised employees spotted this battered veteran among a routine shipment of similar machines returned to Iowa for overhaul and reconditioning. It has once again rolled out of the plant yard to resume its career; destination unknown.

Movie Tips on Speechmaking, Particularly About Safety

Anyone who has to get on his feet and talk—and particularly foremen and supervisors who have to conduct safety meetings—will be interested in six films issued by the National Safety Council and prepared under the guidance of Dr. Irving J. Lee of the School of Speech at Northwestern University.

"The Power of Speech", Film 1, looks at speechmaking from audience and speaker standpoints and explains the difference between a formal and a working speech. What causes stage fright, and how to overcome it, is shown in Film 2, "Butterflies in Your Stomach". Film 3, "The Key to Good Speaking", recommends the method of preparing a typical safety speech, and Film 4 gets you up "On Your Feet" and tells you what to do physically—when and how to move around, what to do with your hands, where to look.

"Now You're Talking", Film 5, covers vocabulary and phrasing of ideas, how loudly to talk, and what an attitude of sincerity and friendliness can do to make a speech a success. In Film 6, "Ring the Bell", you learn how to get and hold your audience, how to break the ice, how to illustrate your points with personal experiences or humor and how to use graphs or charts.

The films are standard 35-mm sound-slide with 16-inch records, 33 1/3 rpm. Each takes about 13 minutes. Council members can get single sets of the six films, packaged and with a leader's manual, for \$115 each; 2 to 9 sets for \$109 each; 10 or more for \$103 each. Individual films in the series are \$20.50 each for single copies, \$19.50 each for 2 to 9 copies, and \$18.40 each for 10 or more copies. Prices to nonmembers of the Council are double those listed. For further information, write to the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

Data on Wellpoint System

A new and complete catalog on the Stang wellpoint system has been prepared by John W. Stang Corp., 822 Atlantic Ave., Bell, Calif. It illustrates the company's entire line of equipment and describes the services it renders to contractors.

The booklet covers the problems and hazards of underground water, the planning of wellpoint installation, test installations on big jobs, and a variety of solutions to individual water problems. On-the-job photos show field installation methods and results.

This literature may be obtained from the company by requesting Catalog No. 50-1, or by using the Request Card on page 16. Circle No. 579.



Greyco
Model 60
ELECTRIC DRILL

- Written lifetime guarantee
- Easy to handle
- Powerful
- All ball and needle bearing
- Compact
- 3-jaw geared Jacobs chuck
- Lightweight
- Patented Jacobs key holder

Write: Greyhound Arc Welder Corp.
604 Johnson Ave., Brooklyn 6, N. Y.



Another Record Proves Maximum Dependability and Minimum Maintenance of PLYMOUTH LOCOMOTIVES

Heavy hauling jobs like this are all in the day's work for this sturdy 30-ton Plymouth gasoline locomotive. Chiefly employed for general haulage of freight from main lines to the Connecticut River Power plant at East Barnet, Vt., the Plymouth Locomotive is always available for other intra-plant transportation of machinery and supplies.

Mr. H. B. Soper, division superintendent of the plant, states that in two years of service this Plymouth has never been laid up for repairs. The total amount of maintenance required, he says, consists only of regular lubrication. Hauling and switching freight cars over 3

miles of standard gauge track, this Plymouth Locomotive has brought time-saving convenience and ease of handling to reduce hauling costs for the Connecticut River Power Co.

Plymouth Locomotives are available in standard and narrow gauge models . . . in gasoline, diesel-electric or diesel-mechanical. Every model, from 3-ton to 70-ton size, is engineered for efficient, cost-cutting operation on every hauling job. For full information on the size and model best suited for your own hauling needs write today for new catalog: Plymouth Locomotive Works, Division of The Fate-Root-Heath Co., Dept. A-12, Plymouth, Ohio.

PLYMOUTH LOCOMOTIVES
GASOLINE, DIESEL, AND DIESEL ELECTRIC
PLYMOUTH LOCOMOTIVE WORKS • Division of The Fate-Root-Heath Co., Plymouth, Ohio, U.S.A.

Crane and Dragline Catalog

The Model 3900 long-reach crane and dragline is described in a 12-page catalog prepared by Manitowoc Engineering Works, Manitowoc, Wis. This machine is rated as a 3-yard dragline, with lift capacities of 60 tons at 12-foot radius and 30 tons at 30-foot radius.

The bulletin lists complete working ranges and capacities, and explains how the added capacity claimed at long radii is obtained. Pictures illustrate features, machinery details, and optional equipment available for special jobs. A half page of diagrams and photos show how the crane can be loaded and unloaded for rail shipment by handling its own components, and two pages illustrate job applications.

General specifications and machine dimensions are also given in the catalog.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 687.

Data on Steam Generator

An 8-page bulletin of engineering data on Kwik-Steam vapor generators can be secured from Littleford Bros., Inc., 457 E. Pearl St., Cincinnati 2, Ohio. Available in six different sizes with a boiler horsepower range of 20 to 165, these units will produce from 500 to 4,000 pounds of steam per hour and may be used for pile driving, concrete plants, asphalt plants, and general heating and power needs.

The bulletin contains a number of

photographs illustrating component parts and features of the unit, and a cross-section illustration of the heart of the assembly. Also included are complete specifications, tables indicating necessary steam requirements to perform various functions, and company recommendations for the particular model to do the job.

Bulletin AA-22 may be obtained from the company, or by using the Request Card at page 16. Circle No. 604.

To Assist on Roller Sales

W. R. Smith, who joined Buffalo-Springfield Roller Co., Springfield, Ohio, in 1946 and has been employed in the Engineering Department, is now Assistant Sales Manager. He will work

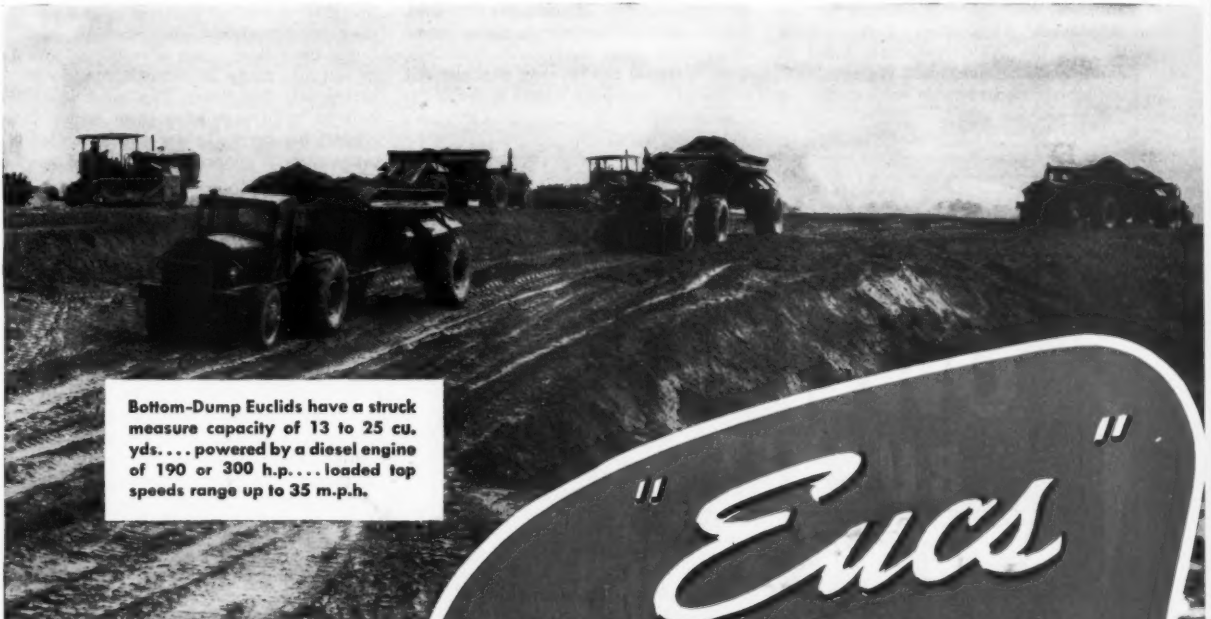
closely with Director of Sales Murray D. Shaffer in promoting the company's line of portable, tandem, and 3-wheel rollers.

A-C President Dies

Walter Geist, President of the Allis-Chalmers Mfg. Co. of Milwaukee, died January 28 of heart failure, at 56. He joined the company in 1909 as an errand boy at 10 cents an hour. By 1928 he was Assistant Manager of the Milling Department; by 1933, a sales representative for the General Machinery Division; and by 1939, Vice President in that division. In early 1942 Mr. Geist became Executive Vice President of the company and in May of that year, President.

DISTRIBUTORS

ALABAMA—Tractor & Equipment Co., Inc., 4401 First Ave. N., Birmingham 1.
 ARIZONA—Lively Equipment Co., Albuquerque, New Mexico.
 State Tractor & Equipment Co., 407 S. 17th Ave., Phoenix.
 ARKANSAS—Euclid-Memphis Sales, Inc., Memphis 2, Tennessee.
 CALIFORNIA—The Euclid Road Machinery Co., 3710 San Pablo Ave., Emeryville.
 COLORADO—Constructors Equipment Co., 3707 Downing St., Denver 9.
 CONNECTICUT—The W. I. Clark Co., 2195 Dixwell Ave., New Haven.
 DELAWARE—L. E. Smith, Inc., Camp Hill, Penna.
 FLORIDA—Florida-Georgia Tractor Co., 2800 W. Bravor St., Jacksonville; 2413 State Road, Lakeland; 3139 No. Miami Avenue, Miami; 1400 S. Orange Blossom Trail, Orlando; New Quincy Highway, Tallahassee; 218 South 12th St., Tampa.
 GEORGIA—Tri-State, Inc., 880 Glenwood Ave. S.E., Atlanta 3; East Side Highway, Macon.
 Tri-State Tractor Co., 712-14 No. Washington St., Albany.
 IDAHO—Intermountain Equipment Co., Broadway at Myrtle St., Boise; 210 No. 4th St., Pocatello.
 ILLINOIS—Euclid-Chicago Co., 6027 Northwest Highway, Chicago 31.
 Euclid Sales & Service, Inc., St. Louis 10, Missouri.
 INDIANA—Euclid-Chicago Co., Chicago 31, Illinois.
 Reid-Holcomb Co., 1815 Kentucky Ave., Indianapolis 23.
 IOWA—The Euclid Road Machinery Co., Hibbing, Minnesota.
 Fehr Tractor & Equipment Co., Omaha 2, Nebraska.
 KANSAS—The G. W. Van Keppel Co., Kansas City 8, Missouri.
 KENTUCKY—Euclid-Kentucky, Inc., 3900 Crittenden Drive, Louisville.
 LOUISIANA—Euclid-Memphis Sales, Inc., Memphis 2, Tennessee.
 MAINE—Clark-Wilcox Company, Boston 34, Mass.
 MARYLAND—Rish Equipment Co., Clarksburg, W. Va.
 L. E. Smith, Inc., Camp Hill, Penna.
 MASSACHUSETTS—Clark-Wilcox Co., 118 Western Ave., Boston 34.
 The W. I. Clark Co., New Haven, Connecticut.
 MICHIGAN—W. H. Anderson Co., Inc., 47 West Seven Mile Rd., Detroit 3.
 The Euclid Road Machinery Co., Hibbing, Minnesota.
 MINNESOTA—The Euclid Road Machinery Co., Highway 159 West, Hibbing.
 MISSISSIPPI—Euclid-Memphis Sales, Inc., Memphis 2, Tennessee.
 MISSOURI—Euclid Sales & Service, Inc., 5231 Manchester Ave., St. Louis 10.
 The G. W. Van Keppel Co., 2440 Pennway, Kansas City 8.
 MONTANA—Hall-Perry Machinery Co., P.O. Box 1367, Butte.
 NEBRASKA—Constructors Equipment Co., Denver 5, Colorado.
 Fehr Tractor & Equipment Co., 1809-11 Cuming St., Omaha 2.
 NEVADA—The Euclid Road Machinery Co., Emeryville, California.
 Foulger Equipment Co., Salt Lake City 8, Utah.
 NEW HAMPSHIRE—Clark-Wilcox Co., Boston 34, Mass.
 NEW JERSEY—L. E. Smith, Inc., Camp Hill, Penna.
 Hubbard & Floyd, Inc., New York 51, N.Y.
 NEW MEXICO—Lively Equipment Co., 2801 No. Fourth St., Albuquerque.
 NEW YORK—Hubbard & Floyd, Inc., 151st St. & Gerard Ave., New York 51.
 T. E. Polts Equipment Co., 3260 Sheridan Dr., Buffalo.
 L. E. Smith, Inc., 387 W. Fayette St., Syracuse 2; 134 State St., Albany.
 NORTH CAROLINA—Hampton Roads Tractor & Equipment Co., Norfolk, Virginia.
 North Carolina Equipment Co., 3101 Nittsburo St., Raleigh; Pineville, Rd. Chertside, Swanton Creek Road, Asheville; P.O. Box 128, Guilford; P.O. Box 685, Wilmington.
 NORTH DAKOTA—The Euclid Road Machinery Co., Hibbing, Minnesota.
 OHIO—The W. W. Williams Co., 835 Goodale Blvd., Columbus 8; 1850 Cleveland Rd., Cleveland 11; 914 Main St., Cincinnati 2; 1260 Conant St., Toledo (Maumee).
 OKLAHOMA—The Euclid Road Machinery Co., Dallas 3, Texas.
 OREGON—Intermountain Equipment Co., Boise, Idaho.
 P. L. Crooks & Co., 2145 N.W. Pettygrove St., Portland.
 PENNSYLVANIA—Atlas Equipment Corp., 635 Ridge Ave., Pittsburgh 12.
 Standard Equipment Co., 152 Horton St., Wilkes-Barre; Rosburn & Looming Sts., Williamsport.
 L. E. Smith, Inc., Camp Hill (Harrisburg); 29th & Montgomery Avenue, Philadelphia.
 RHODE ISLAND—Clark-Wilcox Co., Boston 34, Mass.
 SOUTH CAROLINA—Southern Equipment Sales Co., Sumter Highway, Columbia.
 SOUTH DAKOTA—The Euclid Road Machinery Co., Hibbing, Minnesota.
 TENNESSEE—Euclid-Memphis Sales, Inc., 185 E. Butler Ave., Memphis 2.
 Power Equipment Co., 1218 Island Home Ave., Knoxville; 600 W. Manning St., Chattanooga.
 TEXAS—The Euclid Road Machinery Co., 2524-26 Main St., Dallas 2.
 Lively Equipment Co., Albuquerque, New Mexico.
 UTAH—Foulger Equipment Co., 1361 So. 2nd West, Salt Lake City 8.
 VERMONT—Clark-Wilcox Co., Boston 34, Mass.
 VIRGINIA—Hampton Roads Tractor & Equipment Co., W. 39th and Kilian Ave., Norfolk.
 Rish Equipment Co., 1603 Chamberlayne Ave., Richmond 10; 408 Center Ave. N.W., Roanoke 7.
 WASHINGTON—A. H. Cox & Co., 1757 1st Ave. South, Seattle 4; 2013 Center St., Tacoma; 313 North Mission, Wenatchee.
 P. L. Crooks & Co., Portland, Oregon.
 Intermountain Equipment Co., E. 611 Sprague Ave., Spokane 5.
 WEST VIRGINIA—Atlas Equipment Corp., Pittsburgh 12, Pennsylvania.
 Rish Equipment Co., Kanawha Blvd., Charleston 22; East on U.S. 80, Clarksburg; P.O. Box 269, Bluefield.
 L. E. Smith, Inc., Philadelphia, Penna.
 WISCONSIN—Euclid-Chicago Co., Chicago 31, Illinois.
 The Euclid Road Machinery Co., Hibbing, Minnesota.
 WYOMING—Constructors Equipment Co., Denver 5, Colorado.
 Foulger Equipment Co., Salt Lake City 8, Utah.



Bottom-Dump Euclids have a struck measure capacity of 13 to 25 cu. yds. . . . powered by a diesel engine of 190 or 300 h.p. . . . loaded top speeds range up to 35 m.p.h.

Here's a team—the Euclid Bottom-Dump and the Euclid Loader—that has set new records for low cost earth moving on a wide range of jobs...dams, levees, airports, highway and railroad construction, industrial plant grading and overburden removal.

Bottom-Dump Euclids combine rugged construction, large capacity and fast travel speeds for more profit per load. Designed and built for rugged off-the-highway hauling, "Eucls" provide dependable performance and low hauling cost per pay yard. Owners say: "Bottom-Dumps sure do the job, and at lower cost, too."

TEAM UP FOR YOUR EARTH MOVING PROFITS!

Built to match the speed and efficiency of other Euclid earth moving equipment, the Euclid Loader is designed for use with Bottom-Dump "Eucls" and other large capacity hauling units. It provides fast, mobile loading of practically any material, from loose sand to hard clay and shale, in a short travel distance.

The EUCLID ROAD MACHINERY Co.
Cleveland 17, Ohio



The Euclid Loader leaves a smooth, clean cut when grading uneven contours. Operator has instant control of belt movement and adjustment of the cutting blade for depth and angle of the cut.



Air-Raid Shelters Urged for Buildings

Contractors Hear Plea That Owners Construct Refuge for Workers in Large Cities; Skyscraper Days Gone?

• **BUILDING** owners should make, or be forced to make, relatively safe, economical, air-raid shelters within their buildings as a protection to the people working in such buildings. Such an opinion was expressed to some 1,200 contractors, public officials, and labor leaders by Ralph T. Walker, President, American Institute of Architects, at the annual dinner of the Building Trades Employers' Association of New York City in the Waldorf-Astoria hotel in January. "I believe," said Walker, "that the money necessary to achieve this, is

an absolute must."

Walker, who is a member of the architectural-engineering firm of Voorhees, Walker, Foley & Smith, and a Vice President of the Union Internationale des Architectes, commented on commercial-building restrictions ordered by the National Production Authority. He felt that this order, requiring a license of necessity to build, would severely hit major cities, especially those along the Atlantic coastline, since it would not be easy to make out a case for necessity where there is no

accompanying war work.

Great port cities such as Boston, Philadelphia, and New York, said Walker, should receive special consideration in order to make them "a continuing possibility". The speaker felt that some war supplies, such as ammunition, should not be sent from them, and that warehousing and docking for all export goods should be scattered as widely as possible. Since these large cities are juicy targets for even student bombers, Walker suggested "that we create in every working and dwelling area an adequate place which gives a sense of security".

City Pattern

The audience was told that the decentralization of major cities might be hastened to meet the threat of the A-bomb. Walker reminded the group that during the last war the large turnover in industrial labor due to bad living conditions, with a resulting loss in output, made it essential to do a better job this time. "We must learn how to build permanently in times of crisis," he stressed, "for the so-called temporary is generally a waste of resources."

Walker said he felt that large cities like New York would probably have less major building than other and smaller communities, and for a long time to come "we will be seeking to build with less metal, more masonry and more wood, and lower buildings on more open land." The speaker declared the trouble is "that too many things are in short supply, actually, and also because there is a scrambled demand for others. You can blame, and should, the administration for its bad judgment and past mistakes, but that

does not relieve the immediate necessity."

In conclusion Walker observed that "there are many indications that the day of the skyscraper city is over; that the region with open planning of communities is going to become the city form of the future. It is a well known fact that city forms follow defense patterns, and what we are now considering is a defense against an expanding and aggressive power."

Construction Industry Prepared

According to Peter W. Eller, Chairman of the Board of Governors of the Building Trades Employers' Association, the building construction industry is better prepared today than ten years ago to meet the military and civilian needs. "Our industry is in high gear," he remarked, "We have more mechanics and better equipment and methods than we had in 1940. Our supervisory and technical organizations are at the peak of experience and efficiency following a busy decade instead of a decade of depression. I hope there will be the good sense and that there will be real effort to let this industry live and serve our needs."

Eller cited the stabilized conditions in the building industry in New York City resulting from the long-term collective wage agreements negotiated by the BTEA with the Building and Construction Trades Council, AFL, which continue until June 30, 1953.

Welch Manager in Seattle

Fred F. Welch has succeeded Vernon G. Lindenberg as Manager of the Hyster Co.'s retail store in Seattle, Wash. Mr. Lindenberg died last December.

Truly Versatile...

AN OWEN BUCKET



Rapid excavation in all types of soils with "A" Mouthful at Every Bite.



Owens "lands hand" in tearing down as well as cleaning up on demolition jobs.



Tremendous closing power is graphically illustrated in this rock handling operation.



Even steel girders cannot escape the firm grasp of an "Owen."

More than just buckets, "Owens" are Versatile Tools, earning their way, every day on jobs of widely varying nature.

Sound principles of design and rugged construction are paying dividends to Owen owners everywhere. Write for the catalog.

"A mouthful at every bite."


Old fires by the dozens are handled with ease by versatile "Owens."

THE OWEN BUCKET CO.

4030 Breakwater Avenue, Cleveland, Ohio

Branches: New York, Philadelphia, Chicago, Berkeley, Calif.

CARCO - FIRST IN WINCH PRODUCTION



Carco is first with push-pull cable controls. Through the years Carco has pioneered such important winch developments as anti-friction bearings, dust-tight case, oil bath lubrication.

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The Tag Model 8009 Midget moisture meter indicates, at the touch of a button, the per cent of moisture in lumber or plaster. To check wood, the needle electrodes are inserted in a sample; to check plaster, the needles are removed and the electrodes are pressed directly against the surface to be tested.

New Moisture Meter For Timber, Plaster

The new Tag midget moisture meter, designed for determining instantly the moisture content of wood, lumber, plaster, and wood products, is manufactured by the Tagliabue Instruments Division, Dept. 67, of Weston Electrical Instrument Corp., 614 Frelinghuysen Ave., Newark 5, N. J.

"Fast, accurate, self-contained, and compact" is the company's description of the meter. The hand-held unit measures moisture by the electrical resistance method originally introduced by Tag and considered by Forest Products Laboratories the most suitable for rapid determination of moisture content of wood. Readings are taken directly in per cent moisture,

with no reconversion tables or laboratory tests necessary.

Bulletin No. 1295, which describes the meter's design, construction, and use, may be obtained from the company. Or use the Request Card at page 16. Circle No. 622.

AEC Plant Site Surveyed And Mapped From the Air

For speed, accuracy, and economy, air-survey methods were chosen for Atomic Energy Commission plants in South Carolina. Aero Service Corp. of Philadelphia, which also mapped the Oak Ridge facility in 1942, is mapping the Savannah River Plant near Aiken, S. C.

First photo-mapping flights over the 200,000-acre tract were made early in January. Since then Aero's field survey crews have been busy establishing a network of ground control elevations to be used in compiling contour maps from the air photos. All maps for the area will be delivered to E. I. du Pont de Nemours & Co., which is designing and building the plant for the Government, by May. One map for a 1,000-acre top-priority area had already been rushed to completion in January, through double-shift schedules.

Spirally Welded Pipe

A new bulletin showing typical applications of Lockseam Spiralweld pipe in the construction, dredging, and materials-handling fields has been released by Naylor Pipe Co., 1230 E. 92nd St., Chicago 19, Ill. The bulletin includes data on fittings, flanges, and connections; specifications of pipe from 4 to 30 inches in diameter; and details on Naylor Wedge-Lock couplings.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 578.

No Moving Job Too Big

A 20-page brochure prepared by E. W. LaPlante Co., 2325 E. 46th St., Indianapolis, Ind., illustrates the company motto: "No moving job too big . . . no problem too tough". It traces the history of the company, and outlines its major accomplishments in 60 years in business. Action photos show the moving techniques used on everything from 7-story buildings, and even whole

towns, to water tanks and light frame homes. Other jobs illustrated include whole city blocks moved in one piece, bridges and heavy-machinery movings, and special shoring work done prior to building repair. Facilities for undertaking these jobs and the company guarantee of "no risk" are fully discussed in the booklet.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 658.

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Viaduct Being Built Over Boston Harbor

Concrete Piers Poured Both With Floating Plant and With Pipeline on Work Trestle; Access to Hospital

By WILLIAM H. QUIRK,
Eastern Editor

• A PRIVATE road and bridge is under construction across Lower Boston Harbor, about 5 miles southeast of Boston, Mass. Known as the Long Island Viaduct, it connects Long Island with Moon Island, the latter being joined to the Massachusetts mainland at Squantum by a causeway. The over-the-water portion of the viaduct is 3,450 feet long, flanked by a 1.4-mile approach from Moon Island, and a 1.1-mile approach on Long Island. The construction is for the Department of Institutions, City of Boston, which has a hospital on Long Island formerly reached only by ferry from Boston.

Work on the project started in June, 1950, after the city department awarded a contract to Merritt-Chapman & Scott Corp. of New York and Boston on its low bid of \$2,593,461 for the entire job. The Crandall Engineering Co. of Boston designed the bridge and is supervising the construction which is scheduled for completion this August. Designed for H20-S44 loading, the bridge will have a 24-foot clear roadway with a 4-foot walk on one side. The approaches have a gravel base topped by a 24-foot macadam pavement.

The viaduct is supported on fifteen reinforced-concrete piers faced with granite, and two RC abutments. Piers are numbered in order from Moon Island to Long Island. From the Moon Island abutment to pier 1 there is a 60-foot span, followed by thirteen spans of 250 feet as far as pier 14. The final two spans, from pier 14 to pier 15 to the Long Island abutments, are each 70 feet. The superstructure consists of deck trusses with the exception of one through truss at the channel span between piers 10 and 11, where a 51-foot vertical clearance is provided at high water.

Work Trestle

In this location Boston Harbor has a bottom made up of clay, sand, and gravel, with shallow depths encountered in the vicinity of the islands. Piers 8 to 13 inclusive, where the water is deeper, have timber pile foundations. The piles transfer the pier loads through the soft clay to the firmer and deeper strata of sand and gravel. The other piers are founded on the harbor bottom. All are constructed inside steel sheet-pile cofferdams, except piers 1 and 15, which are land-based.

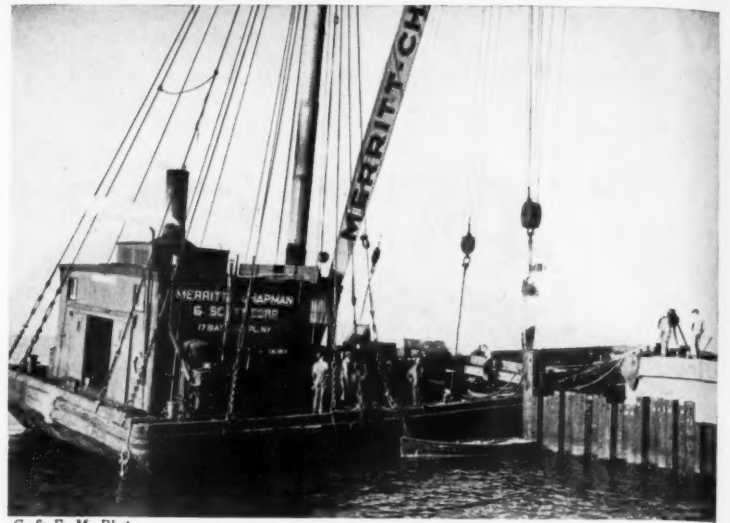
The contractor began operations by excavating for the Moon Island abutment, and progressed across the harbor in the direction of Long Island. To reach the piers at the western end of the project, the contractor built a timber work bridge 500 feet long that extended from pier 2 out to pier 4. A connection from pier 2 back to land was effected with an earth-fill approach through the shallow water, and having a length of about 250 feet with a 16-foot width on top. The work road runs back to the contractor's plant which was set up on Moon Island.

The work bridge contains 51 pile bents on 10-foot centers. Each bent contains three timber piles with 12-inch butts and 8-inch tips, spaced 6 feet apart on centers. The piles are capped with 12 x 12's which carry two 24-inch WF steel stringers capable of sustaining the weight of the heavy crawler equipment. Across the steel

beams is a 4-inch wooden decking with 8 x 8 guards along the sides of the 20-foot roadway; the WF stringers are 80-foot sections. The deck of the work trestle is at elevation 14.0; mean low water is 0.0.

Though the work bridge stopped at pier 4, two-pile trestle bents were continued on out to pier 7. These capped bents on 30-foot centers supported the pipeline through which concrete was pumped as far as pier 7. Transit-mix concrete was used in pouring the abut-

(Continued on next page)



C. & E. M. Photo

At pier 3 of the Long Island Viaduct over Lower Boston Harbor a Vulcan extractor on the lighter Cincinnati pulls cofferdam sheeting.

THE FINEST EVER BUILT



COMPARE THESE OTHER GMC EXTRA-DUTY FEATURES:

Full-Pressure Lubrication of all main bearing and piston pins • Synchro-Mesh Transmission • Tocco-Hardened Crankshaft • Cooler-Operating Rear Brake Drums • Husky 35-Amp. Generator • Airplane-Type Main and

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C. & E. M. Photo

You're looking across from Moon Island to Long Island in Lower Boston Harbor. The contractor's work trestle is at the right of the viaduct piers.

ment and seven piers on the Moon Island side of the project. Piers 13, 14, 15 and the Long Island abutment were poured with concrete pumped through

a pipeline from a floating plant at pier 12; timber bents similar to those used on the west end carried the pipe on the east end of the viaduct project. Central piers 8 through 12 were poured from a floating concrete-mixing plant, since the water was deep enough at such points to provide the necessary flotation for the water equipment.

Heavy Equipment

For building the substructure at the western end, and out the work bridge as far as pier 4, the contractor had available three cranes for excavation, pile driving, form handling, and concrete placing. One was a Link-Belt truck crane with a 60-foot boom, while the other two were Manitowoc Speedcranes—a 2000 Model with an 80-foot boom and a 3000 Speedcrane with a 100-foot boom. They worked on shore, off the temporary work bridge, or on platforms adjoining the cofferdams, thus permitting no interruptions in movement of the truck mixers delivering the concrete directly to the pier, or



C. & E. M. Photo

Two of Merritt-Chapman & Scott's 15 pieces of floating equipment on the viaduct job—the concrete-plant barge Convoy at left, and the derrick lighter Warren.

other vehicles supplying materials to the side of the substructure being built.

Floating equipment consisted of fifteen pieces, the major units being: Convoy, a concrete-mixing plant built on a 38 x 100-foot barge; Bullion, an 80 x 32-foot derrick lighter, 8-ton ca-

capacity with a 100-foot boom; Cincinnati, a 40 x 110-foot derrick lighter, 25-ton capacity with a 100-foot boom; Warren, a 35 x 90-foot derrick lighter, 15-ton capacity with an 85-foot boom; Cavalier, an 80-foot tug boat equipped with a Caterpillar 400-hp diesel engine; Chip, a 20-foot work boat and personnel launch powered by a Lathrop 125-hp gasoline engine.

The rest of the marine fleet was made up of assorted scows carrying equipment, materials, and supplies such as coal, oil, water, cement, aggregate, steel, piles, stone masonry, and the like.

Sheet Pile Cofferdams

Pier 1 on land consists of dual footings on 26-foot centers, each 12 feet square x 8 feet 2 inches deep. Pier 2 out in the shallow water measures 41 feet x 19 feet 3 inches, and has a tremie seal 7 feet thick from elevation minus 9 to minus 3. Above the tremie-seal footings is a stepped-back distribution block from which the pier itself rises. On pier 2 this pier stem consists of ten courses of granite masonry, pointed at the ends, and having a total height of 18 feet 9 3/4 inches. The granite is from 1 foot 3 inches to 2 feet thick, and serves as a form for the concrete pours. It was supplied by H. E. Fletcher Co. of West Chelmsford, Mass., and was delivered in pieces approximately 7 feet long x 3 feet high. The stone was secured in courses by anchors—two for a piece 7 feet or shorter in length, and three anchors for a stone over 7 feet long.

Pier 3 has an 8-foot tremie footing, 48 feet 8 inches x 19 feet 3 inches; pier 4 measures 55 feet 3 inches x 22 feet 6 inches with a 12-foot tremie seal. The increase in size is gradual until the largest piers, 10 and 11, are reached out in the channel. They are each 61 feet 9 inches x 22 feet 6 inches, and have a 16-foot tremie footing from minus 25 up to minus 9 elevation. Similar-size cofferdams were built for seven of the piers—3, 5, 6, 8, 9, 12, and 13—consisting of AP-3 sections driven to form a rectangular enclosure measuring 49 feet 10 3/4 inches x 20 feet 5 1/2 inches.

The largest cofferdams, for piers 10 and 11, are 62 feet 6 inches long x 23 feet 6 inches wide, made up of Z-type sheeting—ZP-32 and ZP-38 sections. They were driven to minus 42 elevation. McKiernan-Terry 10B3 hammers were used in driving the sheet piling. On piers 4, 5, 6, and 7 the sheeting was left in place, but was burned off at minus 3 elevation, the grade at the top of the distribution block. Sheeting was also left at pier 14 along the side bordering the bank, but was removed at all the other piers. Where the rigs could not lift out the sheets with their own pulling power, a Vulcan extractor was put to work.

Typical interior bracing of the cofferdams consisted of a ring of 12-inch BP 53-pound steel beams at plus 10 elevation; the top of the sheeting is at plus 15. The ring was cross-braced with four beams of the same size, with extra diagonal members at the ends. In the

(Continued on next page)

LIGHT TRUCKS BY GMC!

**Unsurpassed in horsepower—you've never seen
1/2- to 2-tonners like these—built for keeps from
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THESE new lightweight champs are a lot more than just newly dressed-up models. They're built to carry you through the critical times ahead. To produce them, we threw away the book and started fresh.

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The moment you put one of these GMC's on the road, you feel the surge of extra power that's turned out by their new engines—horsepower that's unsurpassed in the 1/2- to 2-ton truck field! This extra drive is due to such GMC features as new carburetion design, rotating Free-Valve action in the new "248" engine design that never lets carbon get set to steal power—Turbo-Top pistons that develop higher power without "knock" even when using standard-grade gasolines!

Feature upon feature from each individual model tells you these GMC's are built to stay young and free of trouble from rims to roof. Things like heavier axles, longer "pillow-action" springs, the protection of a built-in radiator overflow tank—all typify the plus values in these new trucks.

Greater Safety—More Comfort

Touch the brakes. Feel the "Twin Action" of the wider hydraulics—now included on all 1 1/2- and 2-ton models in this safer line of new light trucks!

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Yet all this GMC extra value is included in one thrifty price! Feature for feature, no truck in its class has been so completely engineered to meet the challenge of the times.

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GMC Truck & Coach Division of General Motors



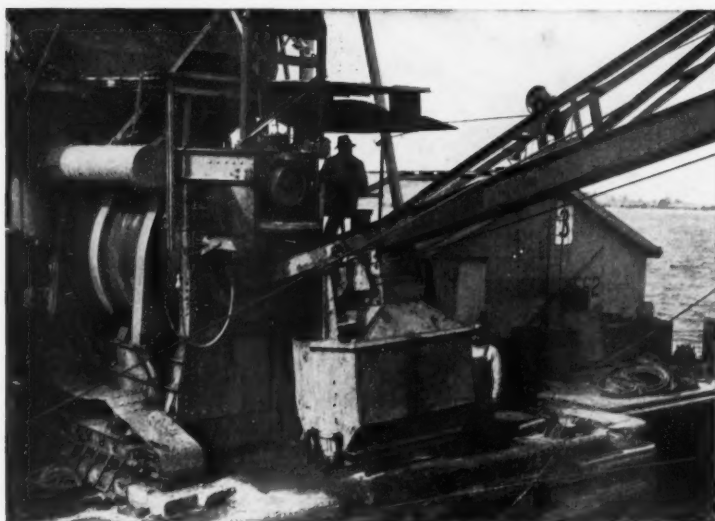
GASOLINE & DIESEL TRUCKS

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GENERAL MOTORS



C. & E. M. Photo

A concrete bucket moves up the special 50-foot boom of a MultiFoote 34-E paver on the way to pier 10.



C. & E. M. Photo

The concrete bucket from the paver discharges concrete into a hopper with elephant trunk at pier 10.

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AND THEY STAY ON THE JOB Wagner loaders are built to withstand years of hard service. They have many outstanding extras in sturdiness that include: precision built gear type oil pump, heavy combination bumper and radiator grill guard, strong tubular structure.

DECIDE NOW to be one of the 35,000 users benefiting from unlimited time and effort savings with the Wagner Loader.

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AND MANY OTHERS

Viaduct Being Built Over Boston Harbor

(Continued from preceding page)

deeper cofferdams another ring or frame, made up of similar-size beams, was placed at minus 2 elevation.

Timber Foundation Piles

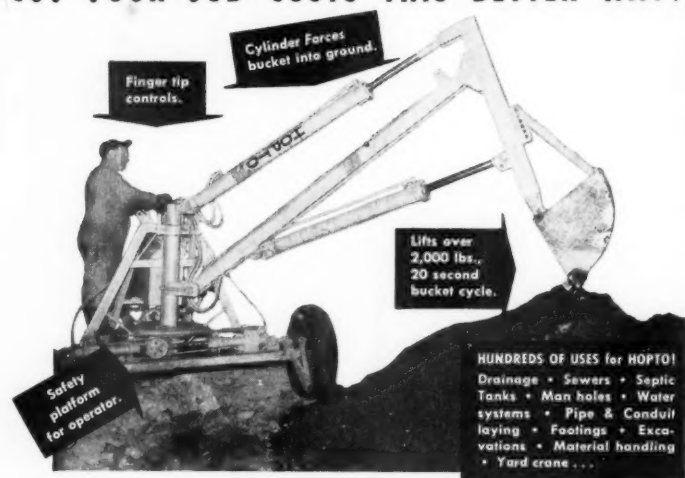
Where foundation piles were required, they were driven by McKiernan-Terry 10B3 hammers. The untreated-timber piles have 16-inch butts and 7-inch tips, average 40 feet in length, and are designed for 15-ton loads. The 200 piles driven in each of

piers 10 and 11 are longer, averaging 52 feet. Spacing varies from 2½ to 3 feet, and the embedment in the concrete footings alternates from 2 to 4 feet with each row of piles. A steel H-beam spud was used in driving the piles.

After the cofferdams were excavated, foundation piles driven, and the tremie seals poured, the cofferdams were underwatered for the building of the distribution blocks and the rest of the piers. The contractor had six large pumps on the job for this purpose—one 8-inch Gorman-Rupp, two 4-inch G-R's, and three 6-inch pumps, a Jaeger, Marlow,

(Continued on next page)

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DIG faster...SHOVEL easier...LIFT higher...
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Here's the unit that's saving money, slashing expenses for contractors and municipalities! Low first cost, minimum upkeep and big 15-30-yard hourly capacity make HOPTO a really profitable producer. Digs down over 9 feet... then lifts up 14 feet to load the highest truck. No counter weights... no swing clearance. Full 180° swing. Three types of buckets, all with replaceable teeth. Complete control for dipper stick, boom and swing. Operates from tractor, truck or jeep power take-off. Easily transported from job to job.

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and a Gorman-Rupp. Usually a combination of three pumps sufficed to dry out a cofferdam.

For the abutments and the portions of the piers that were not faced with stone serving as forms, wooden forms were used in placing the concrete. They were built up of 1½-inch sheathing backed with 2 x 6 studs on 12-inch centers, and double 2 x 6 wales on an average 3-foot spacing. The sides of the forms were held together with Richmond ¾-inch Tyscrus. Reinforcing steel for the structures came from the Pottstown, Pa., plant of Bethlehem Steel Co., and was delivered to the site by barge.

Concrete Operations

All concrete on the project was designed for 3,000-pound strength at 28 days. For the early portions of the work ready-mix concrete was supplied by the Boston Sand & Gravel Co., delivery being made with as many as ten truck mixers from the company's Massachusetts Avenue plant in Boston. The transit mixers backed out the temporary trestle to the work platforms at the piers, and discharged the concrete directly into the forms. For pouring beyond pier 4 at the end of the work bridge, the concrete was unloaded into a Rex Pumpcrete machine set up on the deck, and pumped through an 8-inch pipeline supported on trestle bents as far as pier 7. With this setup the placing of concrete averaged 50 yards an hour. Later on when pier 12 was poured from the floating plant, the Pumpcrete unit was set up at that point to pump concrete through a pipeline that extended on to piers 13, 14, 15, and the abutment on Long Island.

An efficient self-contained floating plant furnished concrete for piers 8 through 12. The Convoy, as it is known, was equipped with a Butler aggregate bin of 35-yard capacity to hold the sand and gravel furnished by the Boston Sand & Gravel Co. Water for the mix was brought from the mainland to the floating plant and stored in a 9,000-gallon tank on deck, and in two tanks in the hold containing a total of 6,000 gallons. The Convoy kept the aggregate bins filled from a sand and gravel barge that tied up alongside the plant. Boilers on the Convoy heated the aggregate and water for winter pours. The floating equipment was either tied up to the cofferdam where the pier was being built, or secured in position with



C. & E. M. Photo

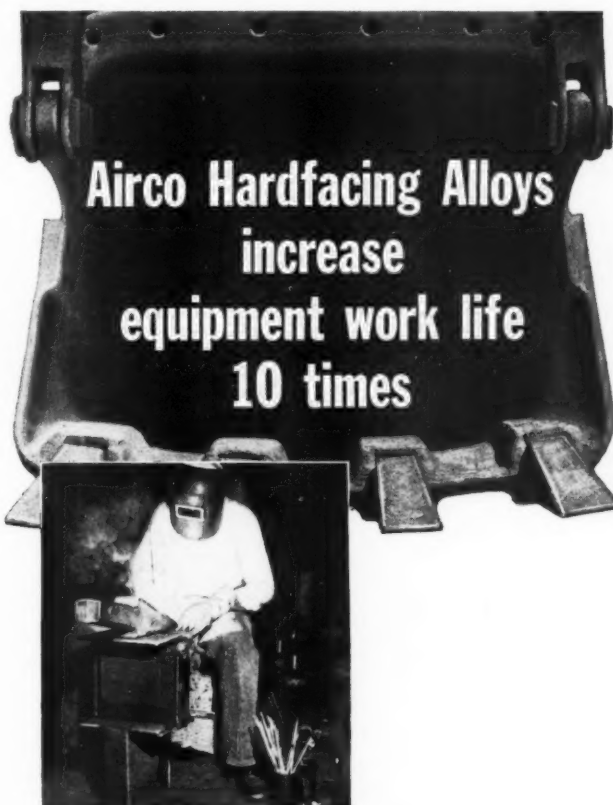
Left to right, Merritt-Chapman & Scott's Office Manager Bud Kelly, Superintendent Harold Jenkins, and Job Engineer Dave Lupprian.

anchors.

Lehigh bag cement was used, stored in a covered barge having a capacity of 8,000 bags. This unique craft is equipped with a machine shop having facilities for drilling, boring, grinding, pipe cutting, and miscellaneous repairs. When not carrying cement it stores equipment, and is moored alongside a lighter or other piece of floating equipment in need of service or repairs. Its roof slides back to admit everything from big pile-driving hammers to unwieldy crates of replacement parts. A hoist on a trolley track runs the length of the barge. At one end is a storeroom where small pieces are kept in cupboards and on partitioned shelves.

A 6½-bag mix was used, the coarse aggregate being graded from 2½-inch down to ½-inch. At the bow of the Convoy, under the aggregate bin, is a MultiFoote 34-E dual-drum paver equipped with a special boom 50 feet long. The skip was removed so that the aggregate from the bins discharged di-

(Concluded on next page)



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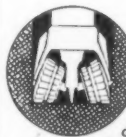
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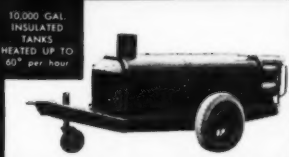
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Viaduct Being Built Over Boston Harbor

(Continued from preceding page)

rectly into the drum. At deck level the bags of cement for each batch were dumped into a shop-made bucket that was raised up a ladder by the skip cable. As the cement carrier was hoisted, it tripped the water-regulating device that timed the mixer. The weighed aggregates, cement, and water were mixed a total of 1½ minutes, then discharged into the paver bucket. The concrete in the bucket then moved up the paver boom so as to empty into the pier forms through hopper and elephant-trunk pipe.

The floating plant has a capacity of 60 yards of concrete an hour, but on the tremie-seal work the placing averaged around 54 yards an hour. The largest single pours were on the seals for piers 10 and 11 which totaled 900 yards each. The distribution blocks in these piers contain 200 yards of concrete; these were poured at an average rate of 58 yards an hour.

Big Blow

No matter how well planned and directed a big construction job is, efficient management at times must bow to the elements, and marine projects exposed to the open sea are always subject to forces that cannot be reckoned with. On September 11, 1950, a hurricane struck the New England coast, sweeping in from the Atlantic to hit the work under way with the full force of wind and wave. Fortunately it came not without warning. Acting promptly and taking no chances, the contractor rushed six tugs from Boston to the job site, and began towing the large fleet of floating equipment back into the shelter of the Inner Harbor. The first warning was given at 11 a. m. and by 11:30 p. m. the last of the fifteen major units was towed away to safety.

In the meantime the cranes were moved from the work bridge back on to shore, valuable pumps were taken out of the cofferdams, and everything made as shipshape as possible before the storm broke. When it did strike, the equipment was all gone. Staging was washed away inside the cofferdams, and the steel sheeting at pier 12 cofferdam was stove in and twisted out of shape. The work bridge took a buffeting, especially the deck, but the piles, caps, and steel stringers held firm. The earth causeway or embankment fill was completely washed away. But as soon as the fury of the winds had passed, the work crews were out repairing the damage, the floating rigs were towed back to the site, and construction on the viaduct picked up where it had left off. The substructure was completed on January 12, 1951.

The steel superstructure of the bridge is being furnished and erected by the Bethlehem Steel Co., under a subcontract to Merritt-Chapman & Scott. Trusses are 26 feet on centers, and 29 feet 3 inches deep. The two-lane deck will be a 3-inch armored-grid slab filled with concrete.

Subcontractor on the dirt approaches is Bernardo Brothers, Inc., of Hyde Park, Mass.

Quantities and Personnel

The major items for the substructure in the Long Island Viaduct contract included the following:

Unclassified excavation	41,306 cu. yds.
Untreated-wood piles	49,800 lin. ft.
Concrete	12,074 cu. yds.
Granite	1,300 cu. yds.
Reinforcing steel	122,000 lbs.

Last summer during the height of the construction season Merritt-Chapman & Scott Corp. worked two shifts, employing a peak force of 150 men. During the fall and winter the work day was a single shift. Personnel included: Charles A. Richardson, Project Man-

ager; Harold Jenkins, Superintendent; Dave Lupprian, Job Engineer; and E. J. "Bud" Kelly, Office Manager.

For the Crandall Engineering Co., consultants supervising the construction, Fred C. Cosman is Resident Engineer and H. T. White is Chief Inspector.

The City of Boston, Department of Institutions, is headed by James McGillivray, Commissioner.

Convertible Excavators

A 14-page illustrated catalog describing a heavy-duty line of ½-yard convertible excavators has been issued by Wayne Crane Division, American Steel Dredge Co., Inc., Fort Wayne 1, Ind. It shows features of all three Wayne Crane models—crawler, truck, and wagon. These include a new deck machinery layout, self-leveling chassis, oversize 20-inch clutches, large modern cab, and right-angle drive mechanism.

The new ½-yard excavators have

lifting capacities ranging from 8 to 12½ tons. Each model is convertible to all front-end attachments: shovel, dragline, clamshell, trench hoe, crane, and pile driver. Gasoline or diesel power is optional. Complete specifications and operation data are included in the catalog.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 628.

Fuller Co. Plant Expansion

A building to house service facilities, the first step in the overall plant-enlargement program of the Fuller Mfg. Co., Kalamazoo, Mich., manufacturer of clutches and transmissions, has been completed. Construction of a laboratory is now under way. Both buildings are located on a recently purchased 26-acre site at 2623 Burdick Ave.



There's Always a BEST WAY

That goes for snow clearance, too. It's no mere accident that

DAVENPORT-FRINK SNO-PLOWS

enjoy engineer-preference throughout the snow belt. They have won their spurs through Faster • Safer • Cleaner Snow Removal.

PLAN AHEAD

The best time to think about increased efficiency for next year is NOW. We'll gladly supply complete information.

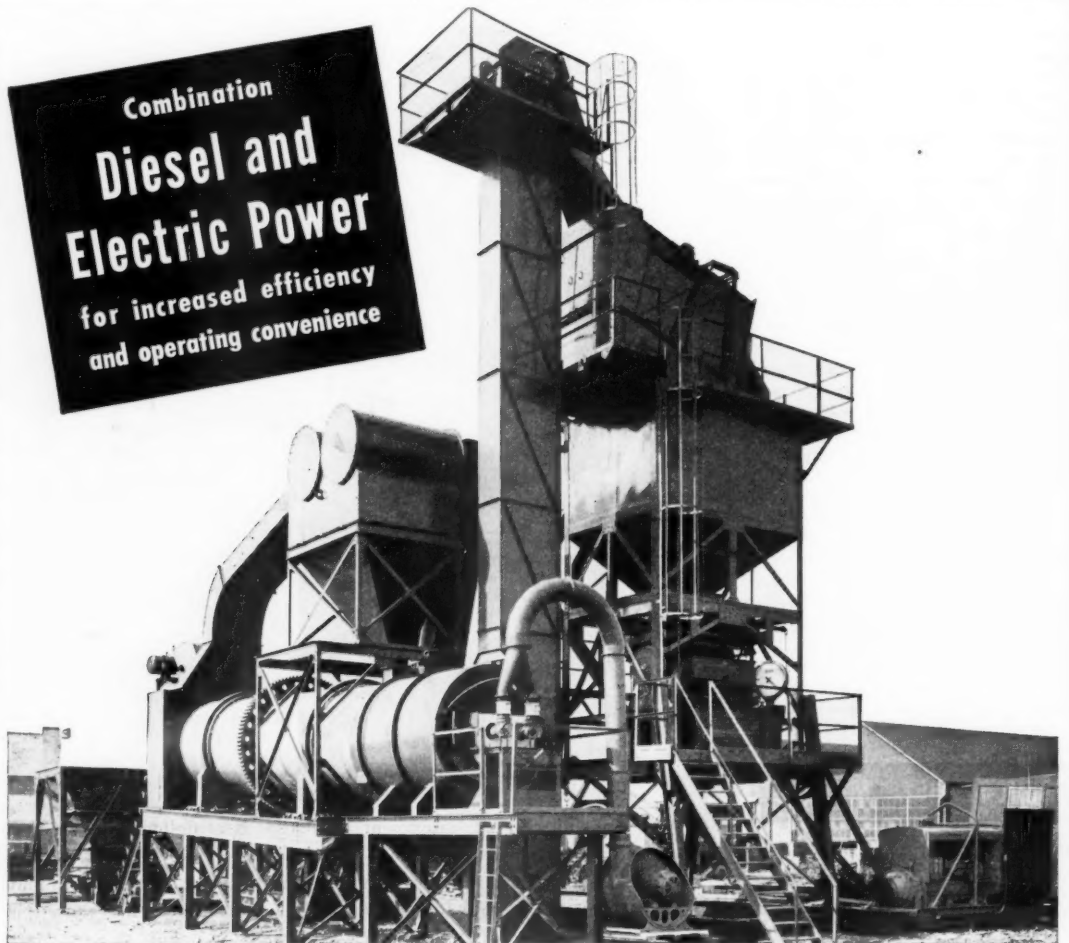
ALL SIZES and TYPES for TRUCKS • TRACTORS • MOTOR PATROLS

DAVENPORT BESLER CORP.

Dept. A

Made in Eastern U.S.A. by FRINK SNO-PLOWS, INC., 1000 Islands, CLAYTON, NEW YORK

Davenport, Iowa



H & B ASPHALT MIXING PLANT



Moto-Paver does the complete mixing and laying job—in one continuous operation. Write for Bulletin MP-49.

This H & B portable type hot mix asphalt plant is equipped for operation with combination Diesel and electric power. Diesel power is used for the dryer and mixer—the two largest power loads. The Diesel power unit has an electric generator which in turn furnishes power for the screen, elevator, etc.

This combination of Diesel and electric power makes for increased efficiency and operating convenience and is another example of the flexibility and adaptability of H & B asphalt mixing equipment.

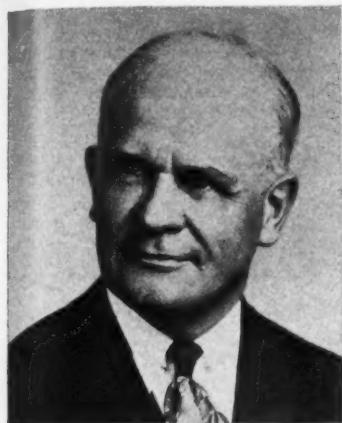
H & B asphalt plants are available in portable and stationary type plants in all capacities. See your local H & B distributor, or write for Bulletin P46.

HETHERINGTON, & BERNER INC.

Engineers • Manufacturers

731 KENTUCKY AVE. • INDIANAPOLIS 7, IND.

**H & B builds portable and stationary asphalt plants
of all types, sizes and capacities**



Paul B. Reinhold, President of Atlas Equipment Corp., Pittsburgh, is nominee for 1951 President of the ARBA.

Paul B. Reinhold Nominee For 1951 ARBA President

Paul B. Reinhold, President of Atlas Equipment Corp., Pittsburgh, is the official nominee for the 1951 presidency of the American Road Builders' Association, succeeding Col. E. R. Needles.

Born in 1890 in Marietta, Pa., Mr. Reinhold was educated at Lehigh University, Bethlehem, Pa. For the next ten years he was affiliated with The Crucible Steel Co. of America, and in 1923 he formed Reinhold & Co., Inc., to market crushed-stone and limestone products for highway and public-works construction. In 1935 he formed Atlas Equipment Corp., which specializes in industrial and road-building machinery and equipment. He has been First Vice President of ARBA and has headed and served on many of its important committees. He heads the Pittsburgh Chamber of Commerce Committee on Highways and Bridges.

Nominated for vice presidents are Charles M. Noble, Chief Engineer of the New Jersey Turnpike Authority; Charles W. Smith, President of Smith Engineering & Construction Co., Pensacola, Fla.; W. A. Roberts, Executive Vice President of Allis-Chalmers Mfg. Co., Milwaukee; A. Diefendorf, Head of the Department of Civil Engineering, University of Utah, Salt Lake City.

Jennings Randolph, Assistant to the President of Capital Airlines, Inc., has been nominated for Treasurer, and for 3-year terms as directors the following have been named: Edgar J. Buttenheim, President, CONTRACTORS AND ENGINEERS MONTHLY, New York; J. N. Robertson, Director of Highways, Washington, D. C.; Raleigh W. Gamble, Superintendent, Bureau of Street Construction and Repairs, Milwaukee; Otto S. Hess, Engineer-Manager, Kent County Road Commission, Grand Rapids, Mich.; Howard L. Way, Highway Commissioner, San Bernardino County, San Bernardino, Calif.; A. E. O'Brien, Executive Secretary, Associated Pennsylvania Constructors, Harrisburg; Murray D. Shaffer, General Sales Manager, Buffalo - Springfield Roller Co., Springfield, Ohio.

Student Engineers Work For Kentucky Department

The Kentucky Department of Highways will continue its Scholarship Plan for 1951-52. It will select 12 graduates of Kentucky high schools, on the basis of a competitive exam given by the University of Kentucky, and allow them to work for the Highway Department until time to register for the University next September.

For the first two semesters, the scholarship student will take the regular freshman courses in the College of Engineering and receive \$60 a month for his university expenses. Then he will be transferred to field, office, or lab work on a full-time regular-pay basis until February 1 of his sophomore

year, when he will return to the University on leave without pay. He will complete his sophomore and junior years alternating periods of school during the second semesters and regular work for the Department through summer and fall months. After summer employment following his junior year, each Student Employee will return to complete both fall and winter semesters of his senior year. The educational plan is now completing its third year, and has been judged most satisfactory.

Offers Five Spreaders

A 4-page folder offering a choice of five spreader sizes for spring highway work has been prepared by Good Roads Machinery Co., Minerva, Ohio. The Handy spreaders described in the folder are available for laying down material in widths up to 12 feet. Special features include a flexible steel-spring keyboard which permits obstacles in the spreading material to drop through without clogging or marring the spread

pattern, and an automatic agitator that works only when it is needed.

Photographs illustrate the standard truck hitch, adjustable 14 inches vertically and 12 inches horizontally, and the one-man hookup. Complete specifications on the five models are given in a 2-page folder insert.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 561.

Wellman Will Expand

The S. K. Wellman Co. will build a \$600,000 plant on Egbert Road in the City of Bedford, Ohio, to manufacture Velvetouch friction linings for clutches and brakes. It will be a one-story structure of 60,000 square feet, with about 90 per cent of the area devoted to manufacturing. It will probably be completed next summer.

Now... a model and size to solve any hydraulic line problem!

Standard and Break-A-Way types. Connect under any pressure without tools. WRITE FOR FULL DETAILS

ULRIX QUICK COUPLERS

For All Hydraulic Lines **ULRICH MFG. CO.** ROANOK, ILLINOIS

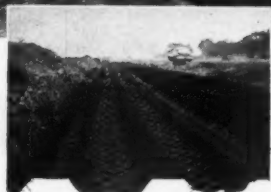


SOUTHWEST Compaction Roller

For compacting earth fills!

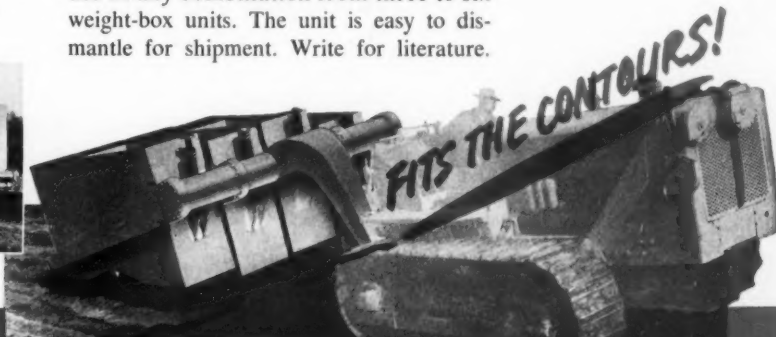
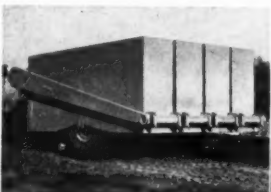
UNEVEN GROUND CONTOURS cannot reduce the efficiency of the new Southwest Compaction Roller. As it travels over the variable surface of the earth fill each weight-box unit with its own wheel and tire oscillates independently up and down. Compaction is positively uniform because the weight on each tire remains constant—there is no bridging and no sudden shifting of load from tire to tire.

The sectionalized tubular yoke permits the use of any combination from three to six weight-box units. The unit is easy to dismantle for shipment. Write for literature.



Note how every print of each tire tread is uniform in depth and shape.

The weight-box units are hinged at the rear and oscillate independently.



CONSTRUCTION MACHINERY DIVISION

Southwest Welding & Manufacturing Co.

Alhambra, California

HAULING SCOOPS BULLDOZERS LOADERS BOTTOM DUMP WAGONS RIPPERS TAMPERS SCRAPERS TREE DOZERS

New Hydraulic Jack And Independent Ram

Universal hydraulic jacks with double pumps and standard-length independent rams are manufactured by Richard Dudgeon, Inc., 789 Bergen St., Brooklyn 16, N. Y. Designed for heavy-duty construction service, they are available in many models ranging in capacity from 40 to 600 lift tons. The rams may be obtained with runouts of 4, 6, 8, or 12 inches.

The forged-steel cylinder and ram, separate from the pump, can be placed in hard-to-get-at positions, otherwise inaccessible, with safety to the operator. The rams may be used in a vertical or horizontal position. The pump unit has a large and small piston—permitting the ram, under low pressure, to be run out at five times the speed at high pressure, thereby saving time and effort on take-up. A quarter turn of the cam handle throws out the large piston and gives action of a single high-pressure pump. Load lowering is positively controlled by a release valve on the side of the pump. Units of two or more cylinders and rams can be operated by one pump. According to the company, packings and all other parts are easily accessible. Gages indicating the pressure in psi and total pressure on the ram in tons are available, as are additional tubing, valves, fittings, etc.

Jacks of smaller and larger capacities, with longer runouts and with other special features, may also be obtained.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 692.

A Bulletin on Soil Mapping, Exploration

The Highway Research Board has released a bulletin on soil exploration and mapping intended to supplement Bulletin No. 13, "The Appraisal of Terrain Conditions for Highway Engineering Purposes", and No. 22, "Engineering Use of Agricultural Soil Maps".

The present bulletin contains five papers: "A System for Designating Map Units on Soil Maps", by Donald Lueder, J. H. R. P., Rutgers University; "Drainage Pattern Significance in Air-photo Identification of Soils and Bed-rocks", by Merle Parvis, J. H. R. P., Purdue University; and "Maps for Construction Materials", by Frank E. Byrne, U. S. Geological Survey; "Development of Geophysical Methods of Subsurface Exploration in the Field of Highway Construction", by R. W. Moore, U. S. Bureau of Public Roads; and "Influence of Topographic Position in Air Photo Identification of Permafrost", by R. E. Frost and O. W. Mintzer, J. H. R. P., Purdue University. Additional information on the status of geological and agricultural soil mapping is given, and the names of geologists and soil scientists are listed.

Bulletin No. 28 may be obtained from the Highway Research Board, National Research Council, 2101 Constitution Ave., Washington 25, D. C. It costs \$1.50.

Lumber Directory for 1951

The 1951 "Where to Buy" is now available from the West Coast Lumbermen's Association, 1410 S. W. Morrison St., Portland 5, Oreg. This directory of members of the Association is designed to aid buyers of Douglas fir, west coast hemlock, Sitka spruce, and western red cedar.

Detailed information is given on saw-mills, remanufacturing plants, timber fabricators, a wood-pipe and tank manufacturer, and wood-treating plants in the Douglas-fir region of western Washington, Oregon, and northern California. New member mills total 66 since the 1950 edition, and their listing along with the changes in the previous members will give lumber buyers the latest

information on mill locations, officials and sales offices, capacities, facilities, and product manufactured. The 1951 "Where to Buy" contains 40 pages, 8½ x 11 inches in size and punched for insertion in 3-ring binders.

This literature may be obtained from the Association, or by using the Request Card at page 16. Circle No. 602.

A New Truck Mixer

Lightweight features of the new Hi-Lo, Jr., truck mixer are stressed by Concrete Transport Mixer Co., 4993 Fyler Ave., St. Louis 9, Mo. The new mixer installed on a single-axle truck, while rated as a 2¼-yard mixer, can carry up to 3 cubic yards of mixed concrete, without exceeding the single-



Installed on a single-axle truck, the new Hi-Lo Jr. mixer can carry up to 3 cubic yards of concrete without exceeding the usual single-axle weight limitation of 18,000 pounds.

axle weight limitation of 18,000 pounds which prevails in many states.

Other features include an open top and visible mixing action, a stationary drum mixer with a revolving blade designed to produce a homogeneous mix, and combination catwalk and fenders as standard equipment. The Hi-Lo units may be obtained with any standard truck chassis or delivered ready to mount on any make or model of truck.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 557.

Heads Haiss Division

Phillip Levin has been named Sales Manager of the Bucket Division of George Haiss Mfg. Co., Inc., division of Pettibone Mulliken Corp.

"Cat" Bulldozer

AMERICA'S ALL-PURPOSE TOOL

W. C. GREEN counts on his versatile "Caterpillar" D7 Tractor with matching 'dozer to pinch-hit on a dozen assignments when the going gets rugged at the Toketee Falls project in Oregon. "This is a straight 'Cat' outfit," he says. "Wouldn't have anything else. I like the dependability and performance—it's built to take it and to give a good day's work every day!"

These machines give you matched design—tractor and 'dozer built to work together. This rugged team is a bear at meeting work schedules. Sturdy construction and quality materials enable it to keep punching full time without down-time, and the special steel cutting edge of the blade hammers through the toughest going. Most important of all,

the precision methods used in "Caterpillar" factories build extra years of life into these tools.

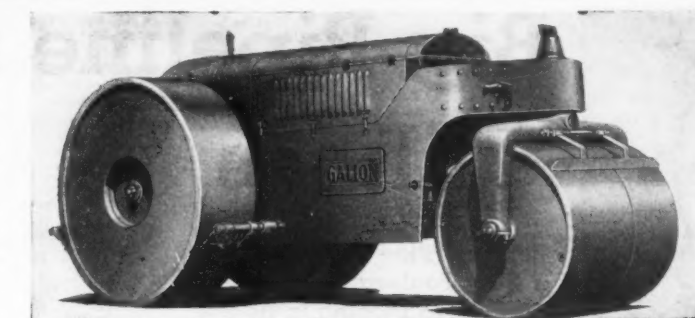
For help with your equipment problems, see your "Caterpillar" dealer now. Today's expanding military program has high priority. But it is recognized that our national preparedness depends upon stepped-up civilian production too. We must have more lumber, coal, food and essential ores. We must continue to build and improve America's vital network of highways. So your "Caterpillar" dealer is especially interested in meeting your needs—through equipment replacement and by exercising his working partnership with you to keep the machinery you have on the job.

CATERPILLAR, PEORIA, ILLINOIS

Three-Wheel Roller With Water Ballast

A new variable-weight 3-wheel roller has been engineered by Galion Iron Works & Mfg. Co., Galion, Ohio. The new Chief is available in 10 and 12-ton (unballasted) weights—either of which can be equipped with 20 or 24-inch-wide rear rolls. The steel drum rolls can be filled with water ballast to obtain a range of compression weights varying from 2 to 3 additional tons, depending on the size of roller.

These Galion ballast-type rolls are fabricated from heavy steel plate, electric-welded, and have machine-finished surfaces. They can be supplied with mats and sprinklers for use on finishing work as well as primary com-



Galion's new Chief 3-wheel roller comes in 10 and 12-ton weights. Water ballast increases these weights by 2 or 3 tons.

paction jobs. They feature a rugged, cab-controlled differential lock, heavy-duty clutches, hydraulic steering, and

gasoline or diesel-engine power. Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 615.

Rules That Drivers Live, Not Die, By

Six times as many American lives were lost on the nation's highways in 1950 as in five months of Korean fighting. To help their fellow highway users live to see the end of 1951, U. S. truck drivers, in a highway-safety contest sponsored by Freuhauf Trailer Co., have come up with a set of "rules drivers live by, violators die by".

1. Don't tailgate—that is, drive so close to the car ahead that you can't stop if the car must, or so close that a car passing you can't get back into the right-hand lane if danger looms.

2. Park all your problems—financial, domestic, or whatever—at the curb when you pull away.

3. Drive defensively rather than offensively. Assume always that the other fellow will do something foolish and is set on risking his neck and yours.

4. Never debate the right-of-way. Give it.

5. Remember that your car will do only as you bid—if you are the master.

6. Never be too lazy to lift your foot from the gas to the brake the instant you see potential danger. It may become real danger.

7. Never plan in advance exactly how many miles you must cover in a given time. Gear your driving to the highway and to traffic.

8. Don't overdrive your lights and brakes.

9. If you must stop on a highway, stop off of it.

10. Be ever-willing to "go the second mile" in courtesy, remembering that you can live by the three C's of safe driving—care, courtesy, and common sense.

11. Accept traffic laws and regulations in the spirit in which they are intended—as aids, not harassments.

12. Don't try to keep up the pace set by a "horse" larger than the one you are driving.

13. Be conscious of your vehicle's position on the highway, whether moving or parked.

14. Never fight sleep at the wheel. Surrender to it off the road.

15. Know the condition of your car and its equipment. A-1 equipment represents a start toward A-1 safety.

Remember that patience will go a long way toward keeping everyone safe and alive on the highway.

Concrete-Form Accessories

A new price list, superseding all previous ones, on Universal form clamping and tying devices has been announced by Universal Form Clamp Co., 1238 N. Kostner Ave., Chicago 51, Ill. In addition to the prices for various quality lots, the bulletin also includes illustrations and brief descriptions of each product.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 634.

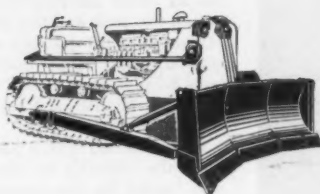
Movie on Stud Welding

"Split-Second Fastening", an 18-minute color sound movie about stud welding in construction, railroad, process, and metalworking industries, is currently being exhibited to more than 600 persons and 20 groups every month, according to the Nelson Stud Welding Division of Morton Gregory Corp., Lorain, Ohio. Introduced in November, 1949, the film has been shown thus far to 256 groups in 117 different cities, and has been witnessed by a total of 8,220 persons in a period of 12 months. Showings may be arranged by writing to the company.



This No. 7A "Cat" Dozer is ruggedly built to bull through heavy boulders, doing clearance on the Toketee Falls project, Oregon. It also does tamping, ripping, and pioneered 3 miles of road for a power line on this essential job.

The same "Caterpillar" Bulldozer is so easily controlled it handles finishing jobs on the downstream side of the dam. After tamping clay core, it is now spreading gravel and sand to tie the clay in on the downstream side of the Toketee project. This tool is tough and maneuverable—stands up under the pounding of a 16-hr. day. Price of a standard "Caterpillar" D7 Tractor is \$11,010; No. 7A Bulldozer, \$1,975; No. 24 Cable Control, \$750, f.o.b. Peoria. Prices subject to change without notice.



NEW ADDITION TO 'DOZER LINE

Here's a specialist that can step up production and cut costs. It's the brand new No. 8U 'Dozer for use with the "Caterpillar" D8 Tractor, with cable control. Working best in loose or light material, the end portions of the blade extend forward to form the U, enabling it to drift large loads for longer distance without spillage. The No. 8U is built to the same high standards of strength and long life as the other "Caterpillar" Bulldozers. The versatility of this new tool gives it excellent performance on all kinds of 'dozing jobs, from stockpiling to pioneering.

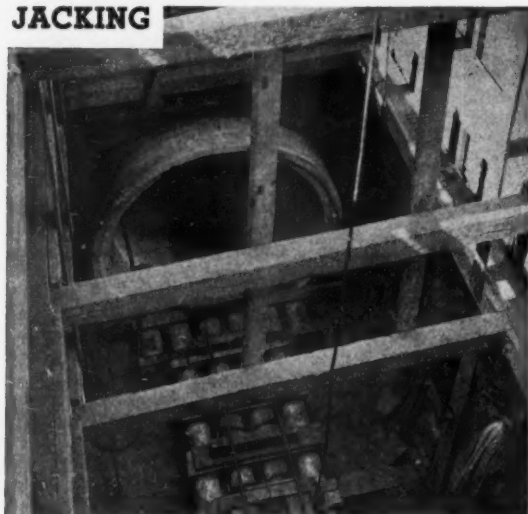
"CATERPILLAR" BULLDOZER EXTRA FEATURES

- 1 Tractor and 'dozer broken to harness, and a size for every need.
- 2 Moldboard curvature for active, rolling, higher production loads.
- 3 Box section side arms—extra thick at points of greatest stress.
- 4 Choice of straight or angling type of blade, simple to maneuver and easy to adjust or detach.
- 5 Your choice of hydraulic or cable controls.
- 6 The power of the "Caterpillar" Diesel Engine is geared to blade capacity.

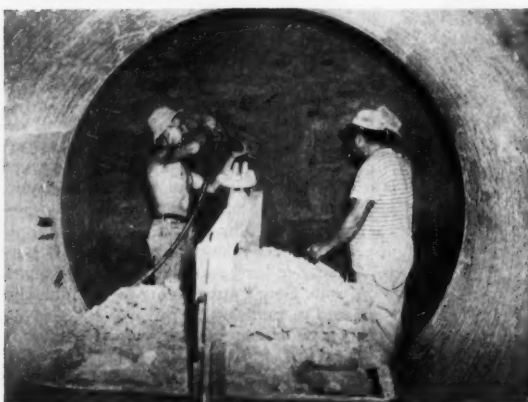
CATERPILLAR

DIESEL ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT

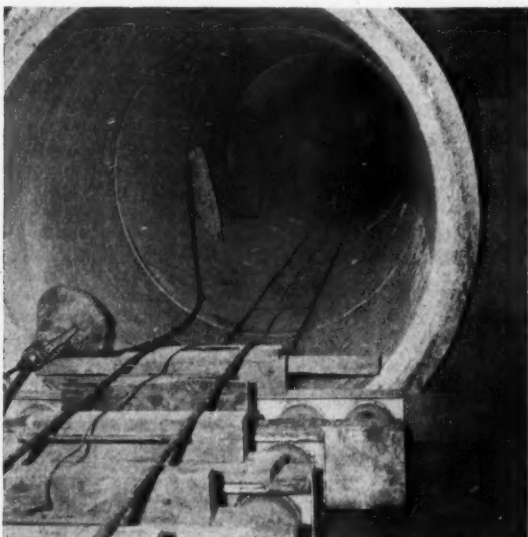
JACKING



A custom-built jack thrusts 1500 D Hume centrifugal-spun RC pipe under Westwood Blvd. on the UCLA campus at Los Angeles.



Men dig heading muck and load it to a rail-mounted buggy.



The buggy rails extend back from the heading over the jack.



The buggy is swung from the rail by a small chain . . .

Big Pipeline to Carry Utilities

OPEN TRENCH

Concrete Pipe Jacked Under a Busy Boulevard; Machines Whip Hard Digging in Adobe On UCLA Campus

By LIONEL PEDLEY,
Assistant Engineer, Architects and Engineers,
University of California
and RAYMOND P. DAY,
Western Editor

• THE successful installation of an 84-inch reinforced-concrete pipeline to carry utility lines on the campus of the University of California at Los Angeles pioneers its general use in place of the usual rectangular poured-in-place tunnel. The design was originated by the Office of Architects and Engineers at UCLA, which is under the direction of Carl C. McElvy, Principal Architect. Construction was in accord with detailed plans prepared by Lester R. Kelly, Consulting Engineer.

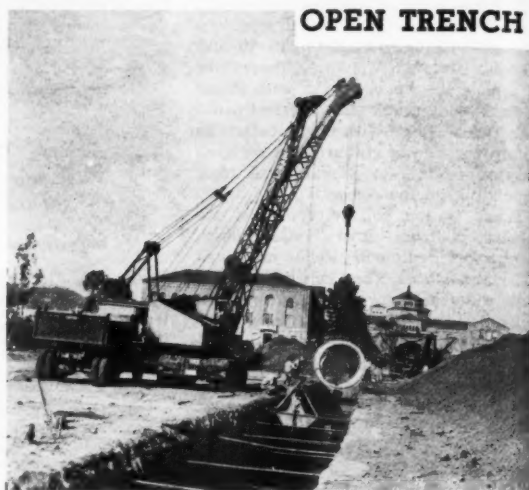
Edward Green, engineering contractor of Los Angeles, has just completed the \$100,000 job under contract with the Board of Regents of the University of California.

Construction started October 12, 1950, with the jacking of 130 linear feet of 84-inch 1500 D Hume centrifugal-spun reinforced-concrete pipe 22 feet below the street level of Westwood Boulevard, main traffic artery of the campus. This section was required to supply utilities from the new heating plant on the west side of Westwood Boulevard to the new university buildings under construction on the east side. The jacking pit, 10 x 20 feet, was located on the east, or upgrade, end of the job.

From the floor of the pit, backed against the east wall, a custom-built 600-ton jack transmitted the thrust from a 10-inch-diameter piston to the lower end of the pipe through a series of 20-inch spacer blocks each 12 inches deep and 4 feet wide. Four of these blocks were successively placed between the jack and the end of the pipe to complete the jacking of each 8-foot section. The custom-built jack, driven by a 5-hp electric motor, was manufactured by Hydraulic Press & Engineering Co. of Los Angeles.

Soil loosened with a pneumatic spade from the heading in front of the pipe was loaded by the 2-man crew into a 1/2-yard buggy, which in turn was

(Continued on next page)



A Northwest crane handles the sections of pipe which were laid in an open trench dug by a Model 900 Austin trencher.



A Caterpillar D2 with dozer drifts dirt ahead for backfill.



An RPE tamping machine gives the dirt its final compaction.

C. & E. M. and American Pipe & Construction Co. Photos



And is hoisted outside by a Moto-Crane. Some 130 feet of pipe was laid by the jacking method.

FIRST SECTION — HEATING PLANT TO MEDICAL CENTER

Description of Utility Lines: 12-inch steam and 6-inch return line
10-inch steam and 4-inch return line
11 electric lines including power, signal, and telephone
6-inch gas line
1 to 3-inch compressed-air line

1. Cost of Enclosing Above Lines in 84-Inch Pipe Tunnel:		Per Linear Foot
Pipe tunnel including excavation and backfill		\$48.00
Electric illumination and ventilation in tunnel		.25
Support and attach pipes and electric cables to tunnel		8.00
Insulation on 12-inch steam line		4.00
Insulation on 6-inch return line		1.50
Insulation on 10-inch steam line		3.00
Insulation on 4-inch return line		1.25
Total Cost		\$66.00
2. Estimated Cost of Protecting Same Utilities Laid in Two Ground Trenches:		Per Linear Foot
Insulation and protection for 12-inch steam line		\$17.50
Insulation and protection for 6-inch return line		7.00
Insulation and protection for 10-inch steam line		15.00
Insulation and protection for 4-inch return line		5.00
Dipping and wrapping protection on 6-inch gas and 1 to 3-inch air line		1.00
Excavation and backfill of trench 6 x 8 feet		6.00
Enclose 11 electric cables in ducts and concrete		28.00
Excavation and backfill of trench 2 x 8 feet		2.00
Total Cost		\$81.50
3. Estimated Cost of Protecting Same Utilities in Rectangular Tunnel:		Per Linear Foot
0.87 cubic yard of reinforced concrete per linear foot, at \$80 per cubic yard		\$70.00
Same insulation and supports as in No. 1, totaling		18.00
Total Cost		\$88.00

COMPARATIVE DESIGN COSTS

SECOND SECTION — MEDICAL CENTER TO CONNECTION WITH OLD TUNNEL

Description of Utility Lines: 12-inch steam and 6-inch return line
9 electric cables including power, signal, and telephone
6-inch gas line
3-inch compressed-air line

1. Cost of Enclosing Above Utility Lines in 78-Inch Pipe Tunnel:		Per Linear Foot
Pipe tunnel including excavation 9 1/4 x 15 feet and backfill		\$41.00
Electric illumination and ventilation in tunnel		.25
Support and attach utility lines in tunnel		7.50
Insulation on 12-inch steam line		4.00
Insulation on 6-inch return line		1.50
Total Cost		\$54.25
2. Estimated Cost of Same Utilities Laid and Protected in Two Trenches:		Per Linear Foot
Insulation and protection for 12-inch steam line		\$17.50
Insulation and protection for 6-inch return line		7.00
Dipping and wrapping 6-inch gas and 3-inch air line		1.00
Excavate trench 4 x 8 feet and place backfill		5.00
Enclose 9 electric cables in duct and concrete encasement		23.00
Excavate and backfill trench 2 x 8 feet for ducts		2.00
Total Cost		\$55.50
3. Estimated Cost of Same Utilities in Poured Tunnel:		Per Linear Foot
0.80 cubic yard of reinforced concrete per linear foot, at \$80 per cubic yard		\$64.00
Same insulation and supports as in No. 1, totaling		13.25
Total Cost		\$77.25

In an effort to check the cost of various designs for work of this type, estimates were prepared for all feasible construction schemes. The results are tabulated above.

pulled back on rails to the jacking pit, lifted to the surface, and dumped. As the removable tracks ran on top of the jack, it was not operated while excavation was in progress. To insure uniform bearing and control of the direction, four steel wedges 1 x 1 1/2 x 6 inches were adjusted between the ends of the pipe sections before applying pressure. These wedges were left in and covered when the inside joints were finally plastered. The outside joints were sealed with bituminous compound before jacking. Pressures varied from 40 tons at the start to 80 tons at completion, which took place November 6, after working 17 eight-hour shifts. The average jacking rate was one foot per hour.

Following the completion of the jacking operation, some 400 feet of 84-inch and 1,700 feet of 78-inch 1500 D pipe was laid in open trench.

Trench Excavation

In order to get the job done in 90 days, Edward Green took over personal control of the UCLA project and pulled every trick he had ever learned out of the hat. In addition to the custom-built jack, for example, he added ripper teeth to the bottom of trench-digger buckets to gouge through hard adobe and jump daily footage.

One of the biggest trench excavators on the west coast saw action in the excavation of the trench. It was a Model 900 Austin, custom-built originally for Gil and Charles Shea. With a trench from 9 1/2 to 10 1/2 feet wide, and from 12 to 25 feet deep, a sizable amount of trench excavation was necessary. The line passed over the campus through a formation of hard adobe, with some cementation of small rock particles. Sandy clay and a few ancient sand seams were also found.

The trench excavator used a long digging ladder, with 4 rows of buckets. H&L teeth were used on the side cutters, while Jiffy teeth saw action along the bottom of the buckets. Green said, "Some of the adobe was so hard we could make only 50 feet of trench a shift. We were changing teeth in that stuff as often as three times in 8 hours."

(Concluded on next page)

MESSINGER VIBRATORS

Flexible Shaft

CONCRETE
VIBRATORS
and
FLEXIBLE SHAFT
EQUIPMENT

FRANK D. MESSINGER
P. O. Box 124
FAIR HAVEN, MICH.

Some exclusive territories now open for dealerships



Use "Messenger" Service



Your form erection crews can maintain fast erection schedules when using Superior Regular or Cone-Fast Coil Ties because simplicity is built-in. Helix coils, electrically welded to the longitudinal wires, receive the Coil Bolts with coarse thread that are easy to apply.

Superior Coil Ties, performing both as tie and spreader, are available in two basic types to meet varying job conditions:

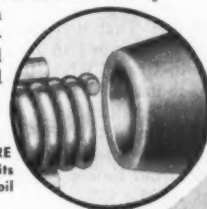
REGULAR COIL TIES are used with Spreader Cones when specifications require the tie metal to be 1" or 2" back of the wall face.

CONE-FAST COIL TIES. Exclusive feature is extension of the coil beyond the ends of the wire struts to hold the reamed cone snugly

in position before the opposing panel is erected. Recommended where large panels are used for walls that do not permit a man inside the forms.

Both types are made for Coil Bolts 1/2" to 1 1/4" in diameter with safe working loads from 5,000 to 36,000 pounds and can be used with wood, combination wood and steel, and all steel forms.

Preplan your form work and cut costs by getting maximum use from your form panels. Our engineering department will help you on special problems.



EXCLUSIVE
CONE-FAST FEATURE
Reamed coil cone fits over projecting coil end . . .

ECONOMICAL . . . these working parts returnable for full credit. Only coil tie is expendable.

SUPERIOR CONCRETE ACCESSORIES, INC.
4110 Wrightwood Avenue, Chicago 39, Illinois
Pacific Coast Plant: 2026 Livingston St., Oakland 6, Calif.
New York Office: 1775 Broadway, New York 19, N. Y.

REQUEST a copy of our 56-page catalog. It contains a valuable table for spacing studs, wales and form ties.

Big Concrete Pipe Will Carry Utilities

(Continued from preceding page)

But the hard adobe didn't stymie Green. Last year he whipped a similar headache by welding special scarifier teeth on the bottom side of each bucket. As the bucket line revolved, he found that the teeth were ripping the formation ahead of the buckets. The first day after they were installed, production jumped from a bogged-down 50 feet to 200 feet a shift, in exactly the same location and formation. By repeating this trick on the UCLA job, Green maintained good footage even in the deep, hard digging.

As the trench excavator moved along, a ground crew of 4 men shoveled fine-grading dirt ahead to the bucket line. Despite the tough ground, vertical 2 x 10 boards with trench jacks for spreaders were used. No parts of the trench ever caved, with that bracing. Green also devised a simple little gadget to place trench bracing faster and safer. What he had in mind originally was a simple 2-man platform, hanging from 1½-inch double-strength pipe, which would reach across the trench and permit men to set trench jacks without shutting down the digger. It worked so well that it was often used behind, in place of ladders. The hangers on this device were made from 1½-inch angle steel. Cross ties were 1-inch round steel bars.

In the deep trenches, excavation ran so heavy that the stacker conveyor could not dispose of all the dirt. A Caterpillar-mounted LeTourneau dozer worked along with the machine, stacking the dirt somewhat higher and pushing it back from the trench as excavation progressed.

Concrete Pipe Placed

Hume centrifugal-spun reinforced-concrete pipe sections were manufactured and delivered to UCLA by the American Pipe & Construction Co. The pipe sections were unloaded to the ground alongside the trench from the delivery trucks, and then picked up after a short storage period and placed in the trench. A Northwest crane handled that part of the work.

The pipe sections were equipped with ordinary lap joints. As the joints were set up, the outside perimeter was wrapped with heavy paper, and the joint was then poured full of rich cement grout. The inside was given a plaster finish to make it smooth and watertight. Kindorf and Unistrut steel hangers for the utility lines were bolted from the inside to Phillips star-drilled lugs and Drive-It bolts, anchored in the 7-inch concrete pipe walls.

Mechanically Tamped Backfill

Deep tamping by a machine which handled 18-inch lifts in one pass was a feature of the backfill. Sand was first placed to reach a point slightly above the spring line. Then dirt from the excavation was clammed in by a Thew-Lorain Moto-Crane. When the first lift was about 18 inches deep over the pipe, it was smoothed down by a D2 Caterpillar and dozer. An RPB pavement breaker with a special tamping foot was rented from Ensco Concrete Cutting Corp. for the job.

Density studies indicated that a general optimum moisture content of about 12 per cent would give the maximum degree of compaction for any given applied effort. Where the moisture content was reasonably close, however, additional moisture was not added. According to Green, densities from deep tamping were as good or better than those which might have been secured by flooding.

Excess dirt left over from backfill was front-end-loaded by a Traxcavator, and hauled to a disposal area inside the university grounds.



C. & E. M. Photo
Lionel Fedley, co-author of this story, inspects the completed pipeline after electrical and mechanical contractors have finished their work.

Costs

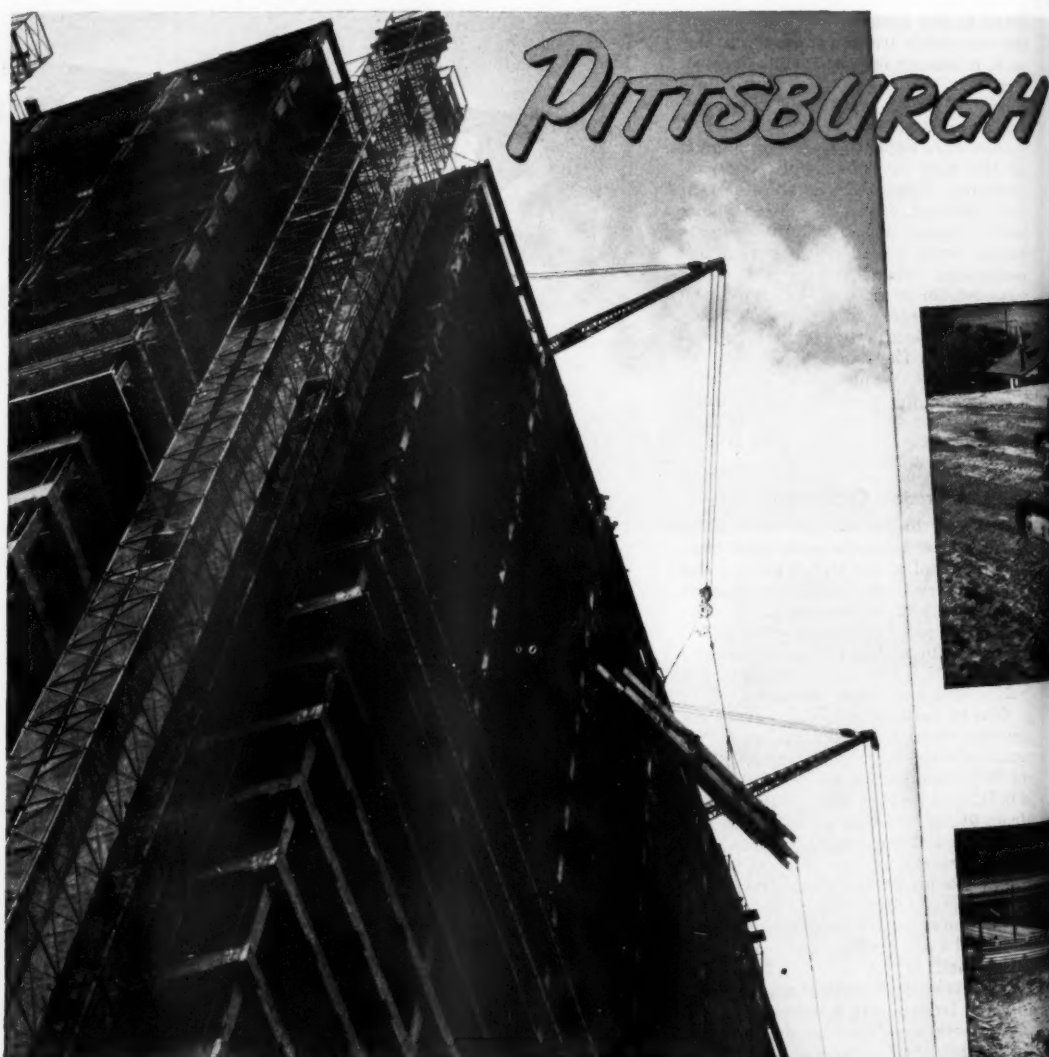
In an effort to check the cost of various designs for work of this type, some very interesting estimates were prepared for all feasible contemporary construction schemes. The results are tabulated on page 27, opposite the beginning of this article.

Mechanical and electrical work ran almost as much as Green's contract. Mechanical installations were made by Johnson & Washer, and electrical work was installed by the Van Cott Co.

Tilting-Top Trailers

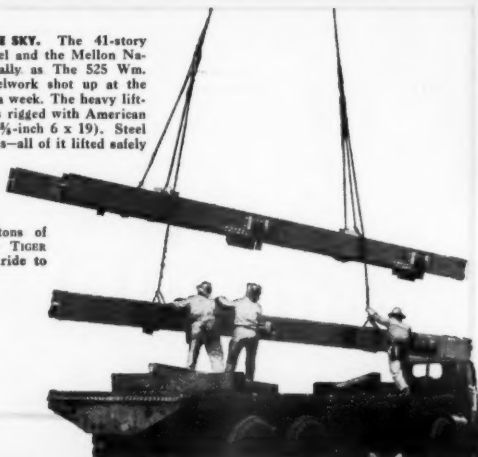
A circular about Dorsey Tilt-to-Load trailers, which are available in three models with capacities of 7,500, 15,000, and 20,000 pounds, has been offered by Dorsey Trailers, Elba, Ala. These units, the literature says, are easy to load, easy to handle, and easy to unload.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 563.



A NEW GIANT SCRAPES THE SKY. The 41-story home of United States Steel and the Mellon National Bank. Known officially as The 525 Wm. Penn. Place Building. Steelwork shot up at the amazing rate of two floors a week. The heavy lifting was done by two cranes rigged with American TIGER BRAND Wire Rope (¾-inch 6 x 19). Steel loads ran from 10 to 30 tons—all of it lifted safely over a busy street.

THE TIGER SLINGS IT. 10 tons of steel held securely with TIGER BRAND Slings for a quick ride to the 32nd floor.



New Overhead Loader

A new overhead mobile loader designed to fit any make of tractor has been introduced by Powertrac Equipment Corp., 51 E. 42nd St., New York 17, N. Y. It will handle from 1½ to 6 cubic yards per minute, according to the size of the bucket, the company says. The bucket is designed to be loaded and discharged up to four times per minute. It loads at the front and discharges at the rear, with one lever being used to control all loader operations.

By means of a special winch and power takeoff independent of the tractor transmission, the Powertrac can lower, dig, raise, and dump the bucket without interfering with the forward or reverse travel of the tractor. This is accomplished by lowering the bucket, moving the tractor forward at the same time into the material being loaded until the bucket fills, then raising the bucket to the dumping point at the same time the tractor is in motion. The



The new Powertrac overhead loader fits any make of tractor and handles 1½ to 6 cubic yards a minute, depending on bucket size.

bucket returns while the tractor is moving forward for the next load. Speed of bucket travel is under the control of the operator at all times.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 691.

New Water Repellent

A new water-repellent silicone product, Siliphane, has been developed through the joint efforts of Prima Products, Inc., 10 E. 40th St., New York 16, N. Y., and the Linde Division of Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y. This transparent product may be brushed or sprayed on exterior above-grade masonry walls of all types, the manufacturer states. According to the company, Siliphane penetrates deeply, coating each part of the masonry with a microscopically thin water-repellent film. It does not close the pores of the masonry, the company says.

Further information may be secured from Prima Products. Or use the Request Card at page 16. Circle No. 569.

Bowstring Timber Trusses

How Monocord trusses can be erected on a job site, to provide a clear-span post-free roof for one-story buildings, is clearly outlined in a new bulletin prepared by Weyerhaeuser Sales Co., P. O. Box 629, Newark 1, N. J. These trusses are fabricated according to design specifications and delivered to the site ready for assembly and fast erection, the catalog says.

The literature includes tables of uniformly distributed design loads, indicating the size of standard trusses needed to meet the load requirements for various spans. Monocord truss parts are mill-fabricated for round-top, flat-top, or straight-pitched roofs. Truss members, including hardware, are shipped on lumber freight rates. All parts may be easily identified for quick assembly by local crews.

The booklet outlines the features of the Monocord truss and illustrates erection methods and completed buildings. The standard 8-panel Monocord bowstring truss may be used for roof spans up to 102 feet. Sketches illustrate the connections used for the timber pieces and the bearing plates required for the various truss lengths. Additional helpful information and a sample order form are included.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 610.

Lubrication Data Book

A new 54-page data book on Lubriplate lubricants, designed for the automotive, quarry, cement-plant, and construction industries, has been offered by the Lubriplate Division, Fiske Brothers Refining Co., 129 Lockwood St., Newark 5, N. J. This informative 5 x 8-inch booklet provides complete product data, lists principal uses, and makes recommendations about the selection of lubricants.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 655.

Heads Builders' Association

John H. Eisele, President of John H. Eisele, Inc., has been elected President of the Building Contractors' and Mason Builders' Association of Greater New York, an organization of 91 general contractors. He succeeds Fred J. Driscoll, President of the George F. Driscoll Co.

Alfred Rheinstein of Rheinstein Construction Co. is First Vice President, and I. Roy Psaty of Psaty & Fuhrman, Inc., is Second Vice President. Hugh M. Hughes, President of H. M. Hughes, Inc., has been re-elected Treasurer.

GETS ITS FACE LIFTED WITH THE HELP OF TIGER BRAND WIRE ROPE



SCOOPING OUT 7000 CU. YDS. OF CLAY AND SHALE A DAY is the average set by five fast moving carryalls. They are working on the cloverleaf intersection of the Greater Pittsburgh Airport Road, the Pitt Parkway West and U. S. Highways 22 and 30. TIGER BRAND Wire Rope operates the 17 cu. yd. scoops. Contractor: Dinardo, Inc., Pittsburgh, Pa. Sub-contractor: Ruth Construction Co., Scottsdale, Pa.

WANT to see a construction boom in action? Come to Pittsburgh. The old "gal" is getting a "face lifting" that will transform her into a sparkling modern city.

Five new stainless steel and aluminum skyscrapers will glitter in the golden triangle. An ultra modern airport and a new railroad station will brighten up the gateways. Express highways will carry automobile travelers quickly into and out of the city.

Construction crews are moving mountains of rock and shale, digging tunnels and building bridges to eliminate bottlenecks on the new super highways.

The famous old "Point," now an eyesore, will become the beautiful Fort Pitt Park . . . and an underground parking area will be built right in the center of the city shopping district.

TIGER BRAND WIRE ROPE DOES THE HEAVY WORK On most of these big engineering jobs, TIGER BRAND Wire Rope is very much in evidence. Contractors in the Pittsburgh area use more TIGER BRAND than any other make.

Why? Because this tough steel rope lasts longer, moves more materials and gets the job done quicker at less cost. Write for our catalog.



CLOUDS OF GRITTY DUST put this TIGER BRAND Wire Rope on the spot. But even under these rugged operating conditions the 1½ inch 6 x 19 rope lasts for more than two months working two shifts a day. The shovel operator says that no other rope gives as good service as TIGER BRAND. Contractor: Adam Eidemiller on Pitt Parkway East.

DIGGING OUT A BURNING MINE at the intersection of the Pitt Parkway East and the Wm. Penn and Lincoln Highways. 80,000 cu. yds. were removed from this one cut by a shovel equipped with TIGER BRAND Wire Rope. Contractor: Adam Eidemiller, Greensburg, Pa.



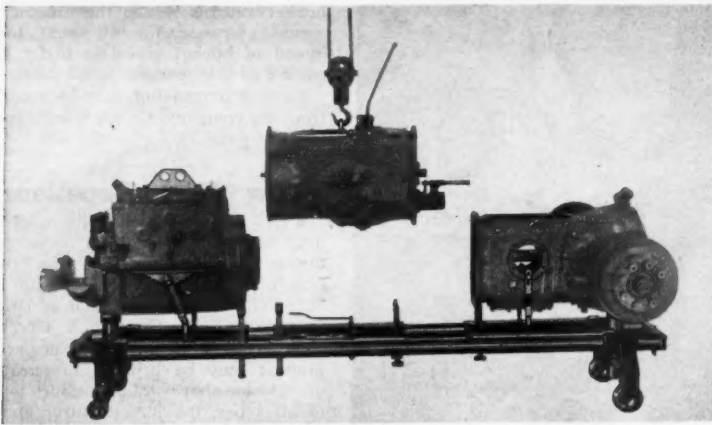
AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND, OHIO • COLUMBIA STEEL COMPANY, SAN FRANCISCO
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM, SOUTHERN DISTRIBUTORS • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

AMERICAN TIGER BRAND WIRE ROPE

Excellay Preformed

UNITED STATES STEEL





K. R. Wilson makes this new tractor dolly which rolls under a tractor for repair work. Built-in jacks provide solid support during the service operations.

WORLD'S FOREMOST "SHAKE-DOWN ARTIST"

GETS
**Greater Soil
Compaction**

IN TWO PASSES—THAN
25 TON ROLLER
ATTAINS IN EIGHT!

The Vibro-Plus Vibratory Soil Compactor type MRJ-6. It weighs only 1.6 tons. Vibrating 950 times per minute, it effectively compacts up to 2,000 sq. ft. per hour under its own power, penetrating as deeply as 40 inches. Towed by tractor, it accomplishes about four times more work.

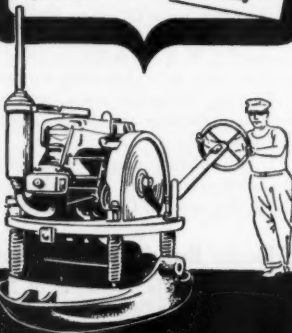
Useful where larger equipment can't go—on open areas, too, it convincingly outperforms other equipment—achieving up to 97.2% of absolute compaction in only 2 passes, compared to 94.2% in 8 passes with a 25-ton rubber-tired roller; 95.6% in 6 passes with an ordinary 12-ton roller; 96.2% in 6 passes with a 7-ton vibratory roller.

You easily can figure how this favorably-priced Vibro-Plus equipment will save impressive amounts of time and money on your jobs. Write for complete facts and name of nearest distributor.

Driven by a 10 H. P. diesel engine, the MRJ-6 is recommended for compacting roads, railway embankments, backfills earth dams, airfields, soil under floors and foundations, etc.

One man can "walk" this Vibro-Plus Compactor or it can be towed by tractor. The 45" x 45-5/16" base is steered by turning the steering wheel. Rubber-tired wheels attach easily for transportation.

VIBRO-PLUS
Soil Compactor
—one of the
complete line
made by the
pioneers in
vibrating and
compacting



VIBRO-PLUS
PRODUCTS, INC.
54-11 QUEENS BOULEVARD
WOODSIDE, L. I., NEW YORK

New Tractor Dolly With Built-In Jacks

A new tractor dolly with built-in jacks for repair work on tractors has been announced by K. R. Wilson, 215 Main St., Buffalo, N. Y. This low-built unit rolls under the tractor. The jacks, operated from front and back of the dolly, can then be raised and spotted under the assembly to provide solid support.

Screws hold each of the three tractor sections in their original related positions; hold-down straps tighten these sections against the supporting screws to prevent shifting during service operations. The center section remains stationary, but the front and rear sections can be moved so that any one of the three can be hoisted vertically for service operations. Returning sections to their originally mated positions for final assembly is simple.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 568.

Link for N. J. Turnpike And N. Y. Thruway Studied

The New Jersey Turnpike and the New York Thruway Authorities held their first joint meeting last January to discuss a link between the two express facilities. They decided that consultants of the two states should start immediately joint studies of alignment and traffic.

M. J. Madigan, of the consulting engineering firm of Madigan & Hyland, will direct the studies for the New York State Thruway, and W. W. Wanamaker will direct the study for the New Jersey Authority, of which he is Executive Director.

Lubricating-Oil Filters

A 16-page booklet which deals with oil filters—their purpose, their makeup, and the qualities to be looked for in a filter—has been announced by Caterpillar Tractor Co., Peoria 8, Ill.

The booklet gives a brief history of lubrication, starting with its application to wooden wheels and axles. It points out that there are two major aspects of a lubricating oil to be considered: the lubricating oil itself, which provides a film between the working parts; and the alloy oils, which hold contaminants in suspension and prevent them from working into metal parts. It is these suspended contaminants which may then be filtered out.

The booklet outlines a number of tests Caterpillar Tractor Co. has made on oil filters, and tells why it uses the type of filter it does.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 631.

Data on Concrete Mixers

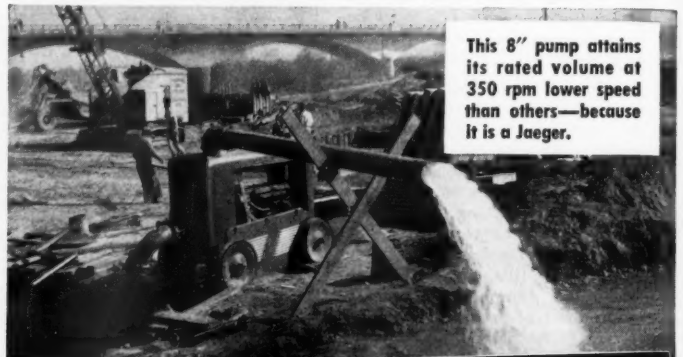
Bulletins on a full line of concrete mixers for 1, 2, or 3-barrow batches are available from Essick Mfg. Co.,

1950 Santa Fe Ave., Los Angeles 21, Calif. Each of the one-page circulars describes, illustrates, and gives specifications on the unit. Features of these mixers include sealed Timken bearings, all-steel bowl and yoke, silent V-belt drive, air-cooled engine, cantilever springs, and electrically welded frame.

These bulletins cover the 3½-cubic-foot Model 350, the 6-cubic-foot Model 62, and the 9-cubic-foot Model 93. The Model 62 is available with side or end-discharge.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 666.

2100 gallons every 1150 revolutions



This 8" pump attains its rated volume at 350 rpm lower speed than others—because it is a Jaeger.

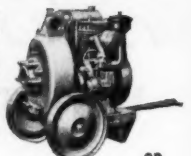
JAEGER pumps pull stronger, pump longer

Because Jaeger dewatering pumps are built oversize, to produce full rated volume at easier speeds, they also hold more priming water and are subject to less abrasive wear. Combined with double priming action and positively lubricated seal (Jaeger patents) they insure fast, sure priming without vapor lock on the toughest pulls, sustained efficiency on non-stop pumping, and thousands of extra hours of service from both pumps and engines.

See your Jaeger distributor or send for Catalog P-10.

THE JAEGER MACHINE CO. 701 Dublin Ave., Columbus 16, Ohio

COMPRESSORS • MIXERS • HOISTS • TOWERS • PAVING MACHINERY



Others 1 1/2" to 10"

Scottie McBlock is "On The Beam" when he says McKissick for —

GUARANTEED CONSTRUCTION BLOCKS

A McKissick Block is fully guaranteed to carry rated loads for the life of the block.

Available in sheave sizes 6" to 36"
From one to ten sheaves
Large center pins and bearing diameters
Alloy steel flame hardened sheaves
Alumite lubrication

Write for McKissick Catalog of this and other McKissick Products.

McKISSICK BUILDS A BETTER BLOCK FOR EVERY PURPOSE

McKISSICK

McKISSICK PRODUCTS CORPORATION

Box 2496 Tulsa, Oklahoma

Urges Action, Not Talk, In Present Road Crisis

Better Maintenance, Accelerated Construction, Stepped-Up Research Called for at Traffic Engineering Conference

IT'S going to take more than talk to keep pavements from being pounded to pieces in the current "emergency". Much better maintenance . . . intelligent research . . . employee training . . . accelerated construction "until they stop us" . . .

Those were a few of the answers proposed by eminent speakers at the Third California Conference on Street and Highway Problems. Sponsored by the Institute of Transportation and Traffic Engineering, in conjunction with University Extension of the University of California, the meeting drew 500 delegates from California and other states. International House, on the California campus at Berkeley, was the site of the January 24-26 meeting.

Purcell Fires Opening Gun

Charles H. Purcell, Director of Public Works for the State of California, set the theme for the sessions when he demanded an all-out effort to hold highways under what may become wartime traffic. California highways, which now carry more automotive transportation than any other state in the nation, have pulled an even 100 per cent traffic increase in the last five years, he said. To meet the situation, Purcell said flatly that every possible construction contract should proceed rapidly until an even more critical set of conditions stops even that work.

Purcell called attention to a statement made recently by Col. E. R. Needles of ARBA, predicting that highway funds may soon be expended primarily on "must" routes. Such a reinstatement of wartime conditions would multiply normal problems enormously, he said.

The role maintenance will play in the coming road drama was detailed by California's bushy-browed bespectacled senior engineer. Maintenance has simply got to stay fluid enough to change direction without loss of efficiency if Washington, D. C., makes any false starts, he explained. Digging beneath that generality, he said that better maintenance must be produced with less manpower. Better services must be demanded from every maintenance man . . . and you've got to start more thorough employee-training programs so men can produce what you demand. Better employee relations; more pay inducements; these are the things that will boost the efficiency of a maintenance department, Purcell said.

Research, too, came in for an airing by Purcell, who predicted that wartime demands would curtail those activities because of the reduction in funds. But research, he said, is—or should be—an integral part of contemporary highway building. Research programs must be encouraged and financed to find "simpler, better ways for us to produce highway products", Purcell said.

If a wartime emergency should force highway programs to remain more or less static for a time, Purcell promised one of the greatest tasks for the future that highway engineers have ever faced. For that reason, he said, detailed planning and possibly the acquisition of right-of-ways should be carried on, if possible. Then when the emergency was over, work could proceed on the greatly accelerated scale which may be necessary.

MacDonald Backs Big Charlie

In a special paper which was read

by the BPR's N. F. McCoy, Commissioner of Public Roads Thomas H. MacDonald backed up many points which Purcell had made. It was a mistake to lift the lid on load restrictions in the last war, MacDonald pointed out. This time load limits should be enforced to the fullest.

If national income and national productivity are to be increased to meet wartime and peacetime needs, the whole transportation system must be improved and enlarged, said MacDonald. And that includes waterways,

highways, railroads, and airport facilities, he said. National income can be increased through the enlargement of transportation media, he pointed out.

Political Compromises Out

Political compromises between road-

user groups are the poorest possible solutions to highway problems, said Senator Randolph Collier. Long-range planning, with thorough thinking about everybody's viewpoint, is a better answer, he said.

(Continued on next page)

PROVED LEADERSHIP in IGNITION

Fairbanks-Morse SUPER SPARK Magneto and Battery Ignition Units have proved superiority and leadership over many years of service.

FIRST to build a simple compact battery ignition unit with coil inside the housing. FIRST to build magnetos and battery ignition units with standard flange to mount on tractors.

Specify Fairbanks-Morse and you specify the "best".



FAIRBANKS, MORSE & CO.

Beloit, Wisconsin

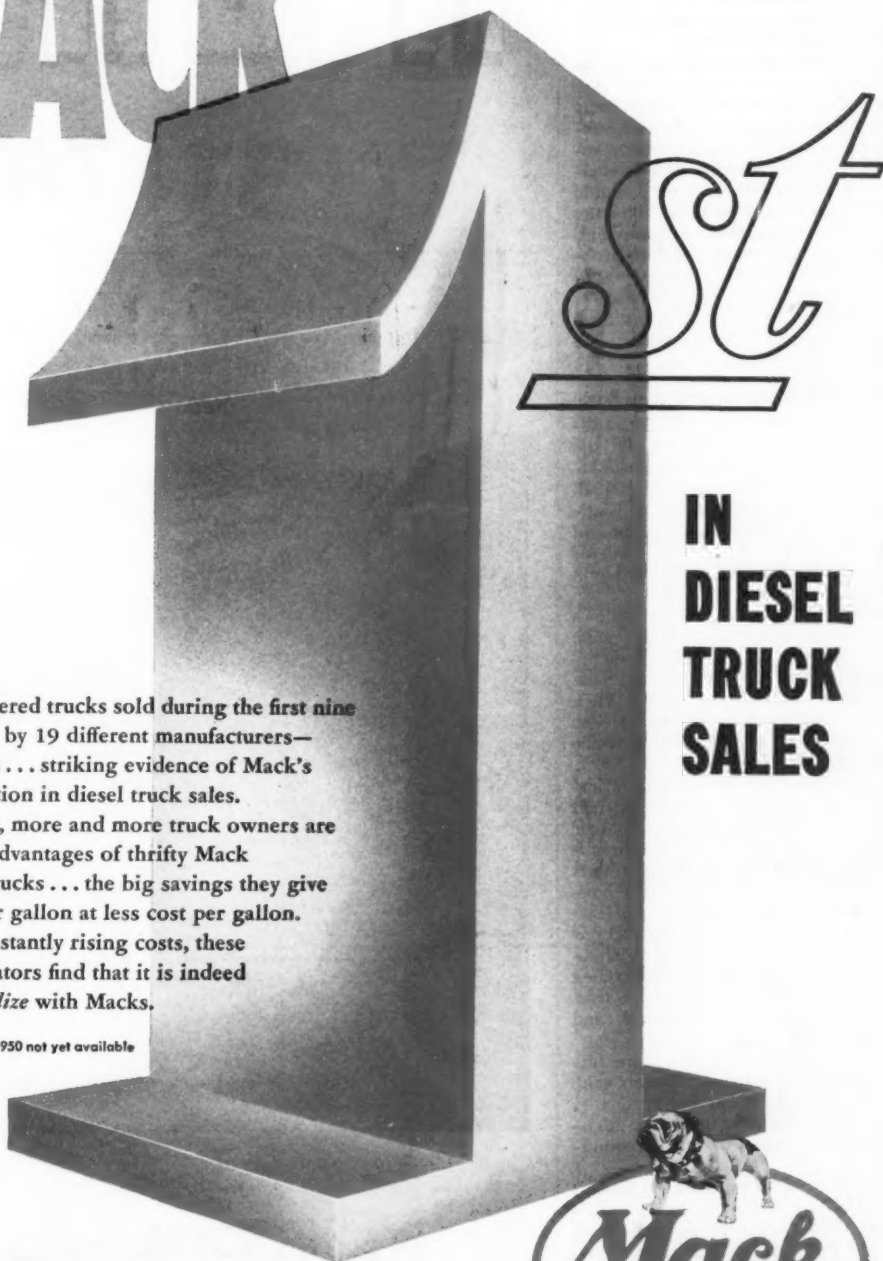
Magneto Division



FAIRBANKS-MORSE

A Name Worth Remembering

MACK



**IN
DIESEL
TRUCK
SALES**

Of all diesel-powered trucks sold during the first nine months of 1950* by 19 different manufacturers—41% were Macks . . . striking evidence of Mack's top-ranking position in diesel truck sales. The country over, more and more truck owners are discovering the advantages of thrifty Mack diesel-powered trucks . . . the big savings they give in more miles per gallon at less cost per gallon. In the face of constantly rising costs, these progressive operators find that it is indeed *profit-wise to dieselize with Macks.*

*Final figures for 1950 not yet available

Be Profit-Wise...Dieselize with

**Mack
TRUCKS**

Mack Trucks, Empire State Building, New York 1, N. Y. Factories at Allentown, Pa.; Plainfield, N. J.; Long Island City, N. Y. Factory branches and distributors in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.

outlast them all

Urges Action, Not Talk, In Present Road Crisis

(Continued from preceding page)

Collier called for credit financing, and wide use of the dollars it would raise, to make up part of California's present \$3,000,000,000 deficiency. Highways are not a luxury, he contended. If the U. S. neglected her roads, she would be a much weaker nation 20 years from now. Collier's borrowed financing would raise about \$1,400,000,000 of the deficit, and would release regular funds for use on urgently needed work outside the major highway system, he said.

A \$30,000 study recently made in search of some feasible toll-road site in California failed to find a single location, he said. A toll road between Los Angeles and San Francisco, through the heart of a major traffic pattern, is not economically feasible, the study showed.

Hydraulics Enters Drainage Design

The application of simple hydraulic principles to the design of drainage structures would reduce erosion by a considerable extent. So said Carl Izzard, Chief, Hydraulics Branch, BPR. Izzard pointed out that about 25 cents of every construction dollar goes into drainage structures, and that between 15 and 25 per cent of maintenance money is spent for drainage.

His department has developed hydraulics curves and other data for use in culvert design. Izzard said that many of the old formulas were fine for sub-critical flows, but that they were completely cockeyed when a design engineer mistakenly assumed they would do where supercritical water velocities had to be considered. Supercritical velocities impose many difficult problems, Izzard said, and he called attention to the similarity in appearance of well designed supercritical pier noses and the typical tapered surfaces of supersonic jet aircraft.

Practical Construction Plays Part

Practical construction and maintenance played a major part in the 3-day sessions. One of the most practical of the talks was a paper by N. R. Bangert, Assistant Maintenance Engineer of the California Division of Highways, telling of various methods of restoring and remixing road-mix surfaces.

Road-mixing in California follows two general patterns, Bangert said. Blade equipment, so far more predominant, is the first classification. Mechanical mixers comprise the second. They have the advantage of taking up less room, and thereby give passing traffic less trouble, Bangert said.

Bangert told the delegates how improved road-mixing techniques had made it possible last summer to tear up and re-lay 4 miles of old bituminous pavement in the Sierras cheaper than 1 inch of new surfacing could have been applied. The old mat was at least 4 inches thick, and in many sections it was from 6 to 8 inches, where maintenance crews had half-soled weakened sections. It was ripped, pulverized, sweetened slightly with asphalt, and re-laid.

Highway bases are much more important than any surface, Bangert said. Modern traffic will beat any surface to pieces unless the base under the highway is able to stand the heavy pounding.

Bangert detailed some of the asphalt tricks California uses to lower maintenance costs, and give a better road. One of the things that makes him fighting mad is to see a maintenance crew lay out an overly-long stretch of windrowed aggregate, apply the oil, fold it in, and then delay their mixing for several days. That raises maintenance costs sky-high, he said, because

when they cut into that windrow again the oil is cold, and it takes much use-less blade mixing to expose that bitumen to the sun. If weather permits, no crew should apply more oil than it can mix out that day. The oil should be applied over the whole windrow area, and then rapidly mixed while it is hot.

Uniformity of windrow end-area is vital to good road-mixing with mechanical travel plants, Bangert said. For road-mixing produces generally an inferior product to hot-mixes or plant-mixes, and anything that can be done to boost accuracy will improve the road-mixed product. One thing he suggested was that laydown machines should be in excellent condition. No operator can do a precise job of laying

blacktop if his machine is old, wobbly, or needs rebushing from stem to stern.

Steel-wheel rollers are useful for compaction where large-sized rock particles are present, or where heavy asphalts are used, he said. Steel and rubber-tire rollers are still the standbys on road-mix work, although grid rollers have now been introduced on some of the jobs.

Control of moisture in the aggregate is a must for road-mixer men, Bangert said. California's specifications permit oil to be injected when the moisture content of the windrow is down to 3 per cent. It has to be down to 1 per cent before the material is laid. Bangert also called attention to the necessity of removing volatiles from the mix, and the danger of dirt or dust over the

old road. He recommended the extensive use of blades and brooms.

The use of 100 to 300 cubic yards of fine gravel per mile has in many cases prevented maintenance crews from over-oiling, and oftentimes it completely rehabilitates a pavement that had too many 200-mesh fines from the beginning, Bangert explained.

Other aspects of construction and maintenance were told by E. J. Donnelly, Engineer of J. E. Greiner Co., Consulting Engineers, Baltimore, Md. Donnelly traced the several aspects of modern freeway and turnpike construction, covering administrative, legal, engineering, financing, construction, and maintenance-operation functions.

(Concluded on next page)

HIGHWAYS

THROUGH LOWC



THE TOWA LINE of Material Handling Equipment Includes: ROCK AND GRAVEL CRUSHERS • BELT CONVEYORS • STEEL BINS • BUCKET ELEVATORS • VIBRATOR AND REVOLVING SCREENS • UNITIZED ROCK AND GRAVEL PLANTS • FEEDERS • TRAPS • PORTABLE POWER CONVEYORS • PORTABLE AND STATIONARY STONE, GRAVEL AND SAND PLANTS • REDUCTION CRUSHERS • BATCH TYPE AND VOLUMETRIC TYPE ASPHALT PLANTS • DRIERS • DUST COLLECTORS • HAMMERMILLS • DRAG SCRAPER TANKS • WASHING PLANTS • VIBRATING SOIL COMPACTION UNITS • DOUBLE IMPELLER IMPACT BREAKERS

The use of resistivity surveys for the solution of many subsurface problems, Donnelly said, had favorably influenced low contract prices on the Pennsylvania Turnpike Extension. He said that the method, while not new, helped to reduce the time necessary for initial explorations to be complete.

ICC Differs on Weights

A sharp difference of opinion between highway engineers and users was spotlighted by Frank E. Landsburg, District Director, Interstate Commerce Commission, who criticized bottlenecks on major highway routes, which he said still existed. Landsburg implied that the Oregon Highway Commission was not justified recently when it held up for three days over-

weight shipment of army ordnance to a nearby base.

The time to get rid of bottlenecks with insufficient clearance, or to correct weak places in highways, is now, Landsburg said. To let such impediments remain in the major traffic routes, he charged, was "... more than a mistake". Later, Landsburg explained that snarls of red tape should be eliminated in the lower echelons of transportation agencies.

As to civil-defense transportation measures, Landsburg described the plan which has now been adopted in Oregon. Under the plan, the State controls only transportation facilities, and leaves local emergency problems to the cities concerned. Cities, he said, should not attempt even in emergencies to

interfere with through transportation of any kind; to do so would be to gamble with military operations or the security of another area.

The Oregon Plan divides transportation into five components: rail, water, air, truck, and bus. Top-level experts from each of these divisions were asked to serve on an emergency committee representing that segment of industry. The chairman of each group then serves on a special 5-man group known as the Oregon Emergency Transportation Committee. That committee, composed of top-flight men in every transportation group, is fully qualified to handle emergency situations, he said.

Contractor-Engineer Relations

Contractor-engineer relations have

improved over the years to a point where both groups can be proud of the part each plays in the overall construction picture, said Leo Westwater, Vice President of Granite Construction Co., Watsonville, Calif. Westwater stressed the need for harmonious relations between contractors and engineers, and called for tolerance, and an end to petty differences.

One city in California, which for 35 years has had harmonious relations between its engineering force and its contractors, got better work and spent only 4 per cent of its money for inspection and engineering. A second city, where bickering prevailed over the same period, got inferior work and the inspection costs were 27 per cent, Westwater said.

Too many people, both contractors and engineers, believe only one way of doing a thing is best, Westwater explained. A more broad-minded tolerant approach to all the other ways would in the long run make for more successful projects at lower cost, he said.

ITTE Activities Told

Reports summarizing current ITTE research were made by division heads under Harmer E. Davis, Director of ITTE. Developments in highways and design; traffic and driver behavior studies; instrumentation development; highway costs; vehicle equipment; and airport structures and materials were explained.

One of the interesting results of the highway studies was a comparative test of pavement roughness, made with the same machine on a variety of highways. Some new California portland-cement concrete highways had as little as 40 inches of roughness, compared to low figures of 80 in the middle west, Professor R. A. Moyer said. California builds portland-cement highways in 12-foot strips as construction proceeds.

Roughness readings on asphaltic-concrete surfaces ranged somewhat higher, Moyer said, with low readings from 45 to 60 inches per mile quite common.

Delegates were shown the research facilities of ITTE at the conclusion of the meeting.

Features of a Tagline

A 4-page catalog and accompanying inserts about the Tag-Master tagline is available from Morin Mfg. Co., Inc., 946 Elm St., West Springfield, Mass. The Tag-Master is available in four types, and can be operated on machines with a capacity range up to 3 yards. The smaller models provide an operating range from truck level to 60 feet below the machine, and the larger models, from truck level to 135 feet below the machine. The catalog points out that all Tag-Masters may be used as a dipper trip, thus providing a single accessory for both crane and shovel operation. Other features are described and testimonials of use on a variety of applications are included.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 633.

Ferguson Recasts Sales

Harry Ferguson, Inc., of Detroit, has reorganized its sales and distribution organization into five regional zones. Each new territory will be headed by a regional manager, assisted by a regional service manager. Headquarters have been established in Oakland, Calif., for the Western Region; Kansas City, Kans., for the Midwestern Region; Detroit, Mich., for the Northcentral Region and the Eastern Region; and Atlanta, Ga., for the Southern Region. Regional heads are Earl W. Lane, West; Thomas J. Hughes, Midwest; Eugene F. Major, Northcentral; Claude B. Quillian, Eastern; and Norman Boardman, Southern.

SUNLIMITED LOW COST AGGREGATE

TODAY'S production of more and better aggregate at lower cost means highways unlimited for America's future . . . and unlimited opportunities for you. Roads—both black top and concrete—bridges, dams, buildings and so many other construction projects, need hundreds of millions of tons of aggregate.

When you figure future contracts, plan on the bidding advantages you get with Cedarapids equipment. Whether you need a single unit or a complete plant, for aggregate or black top, Cedarapids assures the low cost production and operation that keeps you ahead of the competitive parade. Your nearest Cedarapids distributor will be glad to give you all the details.

MODEL "E"—the largest of the Cedarapids line of bituminous mixing plants will handle up to two tons at a batch for your big jobs. Or—if you need only a few loads for patching—use the Cedarapids continuous-mix type Patchmaster. Whatever equipment you require for mixing your black top, check with Iowa first for the best—complete plants, pug mills, driers, feeders, bins.

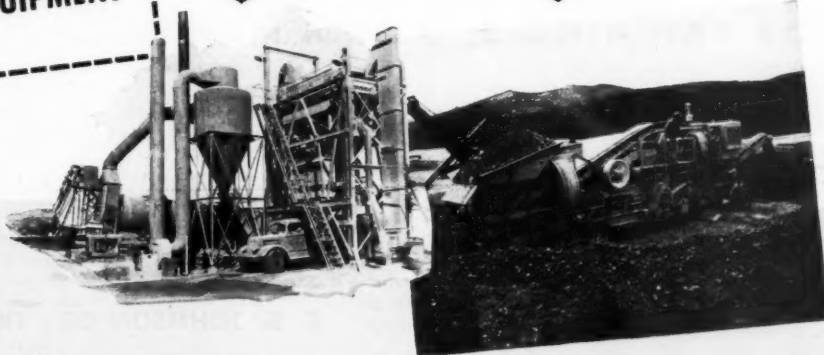
The JUNIOR TANDEM—best known of the Cedarapids portable plants sets the standard for quality production, big capacity, flexibility, low maintenance and trouble-free operation on average size gravel jobs. When big volume is required, pick the Master Tandem and for the smaller jobs—the Pitmaster. Add a Cedarapids Portable Primary and you have a rock plant. With Cedarapids equipment, you can meet any specification in any quantity.

Cedarapids

Built by
IOWA

headquarters for

Quality EQUIPMENT



IOWA MANUFACTURING COMPANY

Cedar Rapids, Iowa, U. S. A.

Big Trailer Hauls Dam Tunnel Liner

The outlet tunnel of Lucky Peak Dam near Boise, Idaho, has been lined with steel plate for its entire 1,138-foot length. Olson Mfg. Co. of Boise held the subcontract on the Army Engineer Corps project to fabricate, transport, and weld the liner sections in place in the tunnel preparatory to the concrete pour. It designed a big trailer to haul the sections 8 miles to the site and maneuver them into place.

Olson engineers dubbed the big trailer "Old Highpockets". It is built around a Mack 6 x 6 tractor unit with a Larison compensating axle under the bogie. A 66-foot double beam section carries a series of expanding lattice rings to hold the pipe in position. Four air-powered cable winches on the trailer helped place the load accurately in the tunnel.

Pipe sections were 23 feet in diameter and 40 feet long, and were formed of $\frac{1}{2}$ and $\frac{3}{4}$ -inch plate with T-stiffener rings to give added strength. Sections were blocked in place and welded together prior to pumping of concrete. After the pipe was set in concrete, the removable lattice rings were collapsed and taken back to the factory for another section. Olson's part of the contract involved about 2,250,000 pounds of steel.

The company makes available to contractors its portable pipe-fabricating and handling equipment, along with an experienced crew. This equipment for cutting, beveling, rolling, forming, handling, and welding steel for large-diameter sections can be moved and set up at a location convenient to any similar large pipeline job any place in the west.

A New Industrial Team Produces Tractor Equipment

A brochure announcing the formation of a new industrial team for the production of tractor-allied equipment has been prepared by the Road Equipment Division, Pullman-Standard Car Mfg. Co., 79 E. Adams St., Chicago 3, Ill. Having acquired the entire tractor-allied equipment business of Isaacson Iron Works in Seattle, Wash., Pullman-Standard will now work with International Harvester to produce a full line of Isaacson equipment, delivered factory-mounted on I-H tractors. The features of this arrangement are fully outlined in the booklet. Also described and illustrated are the production facilities of the Pullman-Standard Co.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 656.

Airfield-Paving Booklet

Many years of experience in the construction of airfields from Alaska to Florida are condensed in a new 20-page booklet prepared by the American Bitumuls Co., 200 Bush St., San Francisco 4, Calif. Titled "Bitumuls for Airfields", the booklet tells what can be done with various types of equipment using Bitumuls asphalt paving materials.

This literature is not intended as a construction manual, the company says, more detailed data being available in the "Bitumuls Handbook" and other company bulletins. It does, however, briefly cover and illustrate airport planning and location, use of low-cost mixtures for inexpensive construction, surface treatments and penetration pavements, maintenance, field and laboratory services offered by the company, and references to CAA airport design standards and construction specifications.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 651.



A liner section for the Lucky Peak Dam outlet tunnel crosses the Boise River on "Old Highpockets", the trailer Olson Mfg. Co. designed for the job. Expanding lattice rings hold the pipe in position.

Movie on Steel Work

A new 16-mm motion picture, with color and sound, is offered by the American Institute of Steel Construction, Inc., 101 Park Ave., New York 17, N. Y. Titled "Build With Steel", this 25-minute educational film depicts the various steps in shop fabrication of structural steel and erection on site, and points out techniques and economies afforded by the use of steel.

Arrangements for borrowing the film for showing to architectural, engineering, construction, and student groups may be made through the Institute.

Bethlehem Appointments

Bethlehem Steel Co. has appointed Frank A. Stroupe General Manager of its Fabricated Steel Construction Division. He succeeds the late Edwin J. Paulus. Walter E. LaBelle, Assistant to the General Manager since 1940, was made Assistant General Manager of the Division, replacing Mr. Stroupe.



ACCURATE • Hi-Speed • FLEXIBLE FOR BATCHING 2, 3 OR 4 MATERIALS

With more than double the filling area of most batchers, Johnson "Hi-Speed" Roadbuilders Batchers save important seconds in charging time. Big 15" x 36" valves are fast-filling . . . flexible, can be added or removed as needed to handle 2, 3 or 4 materials. For charging into truck mixers, "Hi-Speed" Batcher (illustrated) has a cement plug valve in place of one of the 4 aggregate fill valves. Truck-mixer-type weigh-hopper, available in 2, 3 or 4-yard sizes, has 4 compartments . . . 1 for sand, 2 for aggregates, and 1 enclosed compartment for cement. Double-clam discharge gate is easily tripped, opens wide . . . steep slopes of hopper give fast discharge.

A wide-discharge hopper, for standard 34-E paver batch, is readily interchangeable with truck-mixer hopper on same scale frame. Overhead unit frame supports all fill valves, hand levers, hopper and weigh-beam box . . . provides convenient reassembly, insures accurate alignment of scale parts at all times.

For top batching speed on your jobs, plus extremely accurate weighing for uniform strength every batch, use Johnson "Hi-Speed" Batchers. Call your Johnson distributor today, or write direct to . . .

C. S. JOHNSON CO., CHAMPAIGN, ILL.
(Koehring Subsidiary)



JOHNSON Roadbuilders BATCHERS

MIX PLANTS • BINS • SILOS • ELEVATORS • CHARGERS • HOPPERS • CLAMHELLS • CONCRETE BUCKETS

Crawler-Type Tread For Wheel Tractors

The Bombardier Tractor Track specially designed for Ferguson tractors enables these wheel-type tractors to operate in snow and in sandy or marshy ground. The unit as supplied can be used on 52, 56, and 60-inch treads. It is designed to provide additional traction and flotation and allow full use of tractor power.

The idler wheel between the front and rear axles is fitted with a 4.50 x 16-inch tire. The weight carried on the idler wheel is controlled through adjustment springs. By using this adjustment, a portion of the weight carried on the front end of the tractor can be transferred to the idler wheel and track. This is said to permit negotiating in softer ground without the front axle sinking in as deeply as it would if the adjustment were not available. The track itself is composed of two impregnated-canvas rubber bands to which are attached hard-steel cross



The Ferguson Bombardier Tractor Track for wheel tractors was recently demonstrated before Ferguson dealers at Brookings, S. Dak. Two tractors of equal power were chained together for a tug of war. With both tractors applying power, the machine with the track dragged the other behind it while the tires spun uselessly on the snowy ground.

members. The complete tractor-track assembly weighs approximately 450 pounds and can be removed from the tractor in an hour or less, the company says. The bearing surface is 17½ inches in width and 40 inches in length.

Further information may be secured from Harry Ferguson, Inc., 3639 E. Milwaukee Ave., Detroit 11, Mich. Or use the Request Card at page 16. Circle No. 595.

New Use Developed For AEA Test Meter

The Press-Ur-Meter, originally designed for testing air-entrained concrete, may now also be used for determining the specific gravity and moisture of aggregates, according to a recent announcement by Charles R. Watts & Co., 4121 Sixth Ave., N. W., Seattle 7, Wash. This is made possible by the development of a new chart which is used with the meter. The chart and the Press-Ur-Meter are the result of original designs by O. G. Patch, formerly Chief Concrete Engineer with the Bureau of Reclamation at Grand Coulee Dam.

The procedure is a simple one, the company reports. The sample is placed in the base of the meter and the general procedure used in making an air-entrainment test is followed, except that after making a conventional air test, reference is made to the chart. This immediately gives the moisture content or specific gravity.

Further information may be obtained from the company. Or use the Request Card at page 16. Circle No. 650.

Automatic Meters Control Water Delivered to Batches

Auto-Stop water meters, which automatically control the amount of water delivered to ready-mix-concrete batches, are described in the new Bulletin 562, released by Neptune Meter Co., 50 W. 50th St., New York 20, N. Y. These meters are operated by pushing buttons to set the number of gallons desired, turning a reset handle, and flipping the valve handle. The tripping device automatically cuts off the flow when the exact quantity is delivered to the mix, leaving the operator free to devote his attention to other parts of the job, the company says. The bulletin gives complete specifications and prices for 1, 1½, and 2-inch meters for cold, warm, or hot water.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 629.

Oil-Heater Catalog

A new 4-page illustrated brochure on hot-oil heaters has been offered by Hy-Way Machinery, Inc., 3697 Oakwood Ave., Youngstown 9, Ohio. These units are fully automatic heating systems based on a nonpressure type of heat generator in which a suitable heat-exchange oil is heated and then circulated through heat-dissipating coils, jackets, and radiators. The literature points out that this heater is always at atmospheric pressure. It can be fitted for burning gas, light oil, and No. 5 and No. 6 fuel oil.

There are four standard models, and the new B Series, providing an output equivalent to that of a 40 to 125-hp steam boiler. Underwriter-approved burner controls are standard. The models are illustrated and diagrams indicate their dimensions and shipping weights. Models in the new B Series, illustrated in the catalog, are particularly designed for use with portable asphalt plants and may be mounted on a truck or trailer chassis; they come in the same sizes as the standard series.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 593.



MULTIPLE-PURPOSE JOHNSON ELEVATING CEMENT CHARGER

can be used as a batch plant or transfer plant. For batching, standard Charger has a size 14, 1000-lb. cap. cement weigh batcher, hung under a 33-bbl. storage hopper. To charge dual-batch trucks, two 1000-lb. batchers can be used. Converts to transfer plant by removing batchers and cone, and bolting a 50-bbl. extension to the hopper.

8, 20, OR 30-TON CAPACITY LO-BIN TROLLEY BATCHER

is only 7½' to 9½' high for easy charging with front-end tractor loader. Lo-Bin has 2, 3 or 4 compartments, up to 4 weight beams, 22 or 44 cu. ft. weigh hopper . . . or can be arranged for 2 or 3 aggregates and 1 bulk cement compartment. Efficiently serves 28-S, 16-S, 11-S, 6-S mixers. Wheels, pneumatic tires and handy tow-bar are optional.



NEW features on Kwik-Mix 16-S DANDIE®

Latest 16-S Dandie concrete mixer, interchangeable side or end discharge, has adjustable double-contact skip shaker, automatic water system, 3-point suspension mounting on heavy coil springs, cast steel drum heads with machined roller paths. Also, exclusive re-mixing action, Flow-Line discharge. Other models: 3½-S, 6-S, 11-S . . . bituminous, plaster-mortar, mixers, power wheelbarrow

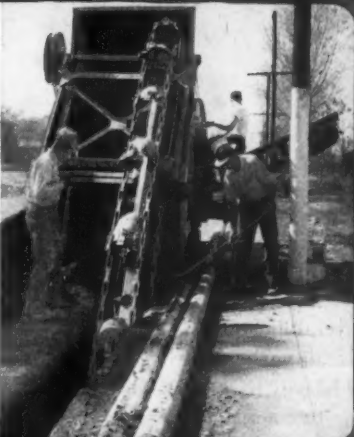
KWIK-MIX (Koehring Subsidiary) - Port Washington, Wis.



"CURB-HUGGING" Parsons 221 Trenchliner®

With shiftable boom for digging within 10" of side obstructions, and reversible power-shift spoil conveyor that shifts through machine in less than 1 min., Parsons 221 Trenchliner hugs curbs, poles and buildings without swerving from grade line. It digs 16 to 36" wide . . . 8'-6" deep. With full reverse, the 221 makes vertical set-ins, undercuts sidewalks, sewers, old mains. Ask about 4 other sizes.

PARSONS (Koehring Subsidiary) Newton, Iowa



MORE WORK-TIME with Koehring Dumptor®

With more than a ton Dumptor strength for every ton of payload capacity, Koehring 6-yd. Dumptor withstands severest loading shocks. Sides, end and triple-strength bottom of all-welded body are heavily reinforced. Gravity dump eliminates body hoist maintenance. Same forward and reverse travel speed gives fast shuttle hauling. Check Koehring excavators and cranes.

KOEHRING COMPANY Milwaukee 16, Wis.



Mixed-in-Place Mat Tried on Town Road

Asphalt or Tar Is Mixed With Gravel in State-Wide Program; Maintenance Crew Does Work With Rented Triple Tiller

• A SPEEDY yet economical method of surfacing town roads was initiated in Vermont last season. An 8-mile experimental program was completed on short sections of state-aid town highways by laying a bituminous mat of mixed-in-place gravel and either asphalt or tar. The various projects ranged in length from 0.2 to 1.5 mile, with the townships supplying their own maintenance crews for the work, and the Vermont Department of Highways furnishing the necessary engineering supervision.

Gravel aggregate came from local town sources, while the bitumen was furnished and applied by dealers or agencies in the vicinity of the job. The American Tar Co. of Boston supplied, at the lowest bid price, all of the asphalt used on state and state-aid roads in District 1, and Koppers Co., Inc., of Everett, Mass., had the contract to furnish all the road tars used. The Standard Oil Co. of New York supplied some of the asphalt used on the town highways.

All the mixing on the road was done

by a Seaman Triple-Tiller Pulvi-Mixer having a mixing width of 6 feet, and pulled by a rubber-tired tractor. The machine was rented from the Hill-Martin Corp. of Barre, Vt., with A. Richard Martin, a member of the firm, personally supervising its operations for this work.

Some of the projects were new construction on roads that had never been paved, while others consisted of resurfacing bituminous tops that were in need of repair. The average thickness of gravel mat was 3 inches loose spread, which compacted to 2 inches under rolling. In a few instances, however, on more heavily traveled roads, the mat was thicker, formed with 4 inches of gravel.

Typical Project

A typical example of a resurfacing project was a 0.2-mile section of a town road near Jacksonville in the Town of Whitingham, near the southern border of the Green Mountain State. The existing pavement was blacktop, an 18-foot surface of treated gravel, that was rough-riding, cracked, and broken in many places. The portion chosen for improvement was on a hill where rapid runoff and poor drainage were considered responsible for surface failure. Accordingly, before any paving was done, the town forces first installed underdrains to carry off storm water before it might affect the highway.

Then the original bituminous mat was broken up with the scarifying teeth of a motor grader and a roller. This loosened gravel was spread out to a 20-foot width, since the old surface was extended a foot on each side from the former 18-foot paving. More gravel was added from nearby borrow pits, with trucks end-dumping down the center of the road and a motor grader spreading the material. About 1½ inches of crushed gravel was added to give the mat a total thickness of 3 inches, loose depth.

The gravel, both old and new, was next broken up and blended by the Seaman Triple-Tiller Pulvi-Mixer pulled by a John Deere rubber-tired tractor. Two passes of the machine with the fast-moving tines were sufficient to prepare the layer of gravel for the bitumen. The two types in general use on the Vermont road-mix work were MC-2 asphalt or cutback RT-6 tar.

Gravel and Asphalt

On this typical job MC-2 asphalt was used, supplied by the Standard Oil Co. and hauled from its tank farm at Albany, N. Y., 65 miles to the job site. The hauling was done by Gorman Bros., Inc., of Troy, N. Y., using an Etnyre 1,545-gallon distributor mounted on an Autocar. The asphalt was applied the full 20-foot width in two shots of 0.5 gallon to the square yard each time. After the first application the bitumen was worked into the gravel by the Pulvi-Mixer, and then the second shot was made, followed by more mixing.

Altogether in the mixing the Pulvi-Mixer made four passes across the 20-

(Concluded on next page)

Ask any successful contractor...



Ask him how important the careful choice of a surety company can be. Chances are he will give you several illustrations from his own experience... a bid in a distant locality where the backing of a nationally known surety weighed heavily for acceptance... a filing deadline met because his surety company had the organization to act promptly and efficiently in an emergency... a complex or unusual project that called for the broadest possible bond underwriting experience.

These are some of the things which enable a resourceful, respected surety company to be truly helpful to a contractor. These are some of the reasons why it is important to select your surety company with care.

Coast to coast... you can count on
The Aetna Casualty and Surety Company
for prompt, efficient contract bond service.

"No Job too Big... No Job too Small"



AETNA CASUALTY AND SURETY COMPANY

The Aetna Life Affiliated Companies write practically every form of insurance and bonding protection

LIFE AND CASUALTY

Aetna Life Insurance Company

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FIRE AND MARINE

Automobile Insurance Company

Standard Fire Insurance Company

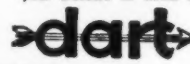
Hartford 15, Connecticut



The Dart Model 500CW

The Dart Model 500 CW Vibrator has a 5 h.p. Wisconsin air-cooled gasoline engine with handy wheelbarrow frame. Full swivel base allows vibrator to be used in any position. Sturdy, lightweight 20-foot cable facilitates one-man operation.

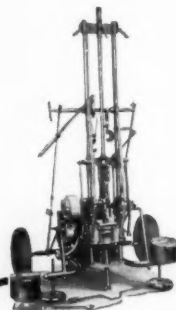
See Dart Gasoline and Electric models at your Dealers or write for free literature.



Manufacturing
& Sales Co.

1246 Champa St.

Denver, Colorado



DRILL BLAST HOLES for 30 per foot!

with the

HOSSFELD ROCK DRILL

Drills 1½ to 3-inch holes up to 4 inches per minute through limestone. Drills same diameter hole FULL DEPTH at any angle from vertical to horizontal.

ONE-MAN OPERATION... powerful gas engine... mounted on oversize rubber tires for easy moving from hole to hole.

New Prospecting Attachment

This new attachment makes the Hossfeld Rock Drill ideal for prospecting with accurate readings for depths to 70 feet. For complete information on the Rock Drill and Prospecting Attachment write today to Dept. CEM.

WRITE FOR
COMPLETE
DETAILS

HOSSFELD MFG. COMPANY
WINONA, MINNESOTA



C. & E. M. Photo
A Seaman Pulvi-Mixer pulled by a John Deere rubber-tired tractor makes a pass over a town road near Jacksonville, Vt., in the Town of Whitingham.



C. & E. M. Photo
Left to right, Charles Plumb, Vermont State Highway Department Engineer; Burton Morse, Road Commissioner of Whitingham, who supervised the road-mix project; and A. Richard Martin of Hill-Martin Corp., from which the Pulvi-Mixer was rented.

foot width to blend together the gravel and asphalt. This provided a slight overlap at each pass since the machine has a 6-foot mixing width. Even before the mixing was completed, an initial compaction of the bituminous surfacing was achieved with a Ford rubber-tired tractor that ran continuously up and down the road. On some of the projects this first rubber-tire rolling was done with a loaded truck. Final compaction was handled by a Buffalo-Springfield 10-ton 3-wheel roller.

Traffic was permitted during all the operations, the rubber tires on the vehicles being considered helpful to the kneading of the bituminous mat. Only five men made up the maintenance crew of the Town of Whitingham, which completed the job in a single work day under the direction of Burton Morse, Road Commissioner. This project is located in District 1 of the Vermont Department of Highways of which I. S. Pelsue is District Highway Commissioner with headquarters at Bennington. Charles Plumb of the District 1 office represented the State on the Jacksonville project.

District 1

Three other jobs of a similar nature were completed in District 1 last season near Pawlet, Danby, and Dorset, ranging in length up to 1½ miles. District 1, one of the twelve districts into which the state is divided, includes all of Bennington County in the southwest corner of Vermont, two townships in Windham County to the east, and three townships in Rutland County to the north, or a total of 22 townships. The District maintains 156 miles of highway on the state system.

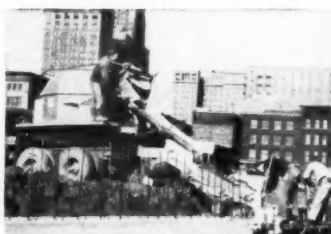
This year more mileage of this road-mix type is expected to be done on secondary highways where the economical factors of low cost in materials and speedy completion are highly important. From 0.5 to 0.75 mile has been averaged per day on these projects.

The Vermont Department of Highways is headed by F. Richard Bradley, Commissioner. Hubert E. Sargent is Chief Engineer. F. C. Coates is Construction Engineer, and L. W. Brownell is Maintenance Engineer.

17 Years Young
and
3,100,000
Cubic Yards
to show for it!



Worthington-Ransome 126-S discharging full 5 cu yd batch in approximately 30 seconds.



One of Arundel-Brooks' 6½ cu yd agitators pouring a retaining wall at General Sam Smith Park, being built to relieve traffic congestion at Light and Pratt Streets, Baltimore.



126-S Worthington-Ransome Big Mixer at Arundel-Brooks Concrete Corporation's Wolf Street plant, Baltimore, shows hardly any sign of wear after having poured 3,100,000 cu yd in its 17 years.

In 1950—its 17th year—this veteran concrete mixer poured more than 250,000 cu yds on a single set of liners!

This extraordinary performance of a 126-S Worthington-Ransome Blue Brute concrete mixer is attested to by Arundel-Brooks' records. The machine, given proper maintenance over its lifetime, shows virtually no wear after uncounted hours of profitable service.

Arundel-Brooks operates two other Worthington-Ransome Big Mixers—

an 84-S at the Sparrow's Point plant, a 56-S at Brooklyn, Md.

And eight of the company's growing fleet of truck-mounted agitators are Worthington-Ransome Blue Brute Hi-Ups, considered "highly satisfactory in every respect."

These eight are used for most long-distance hauls because their light weight* permits carrying a maximum payload with strict adherence to highway load limits.

FIND OUT WHY THERE'S MORE WORTH IN WORTHINGTON

See your nearby Worthington-Ransome distributor. Worthington Pump and Ma-

chinery Corporation, Construction Equipment Sales Division, Dunellen, N. J.

*7,290 lb for the standard 4½ cu yd truck mixer, as little as 6,700 lb for 6½ cu yd agitator models.

WORTHINGTON



You'll find you, too, can get the real performance plus from Worthington and Worthington-Ransome Blue Brutes—a broad line of construction equipment noted for the rugged quality your type of work demands.

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IF IT'S A CONSTRUCTION JOB, IT'S A BLUE BRUTE JOB

AMERICAN
Deluxe Concrete
WHEELBARROW

Code
PERFECT
15 Gauge
seamless tray



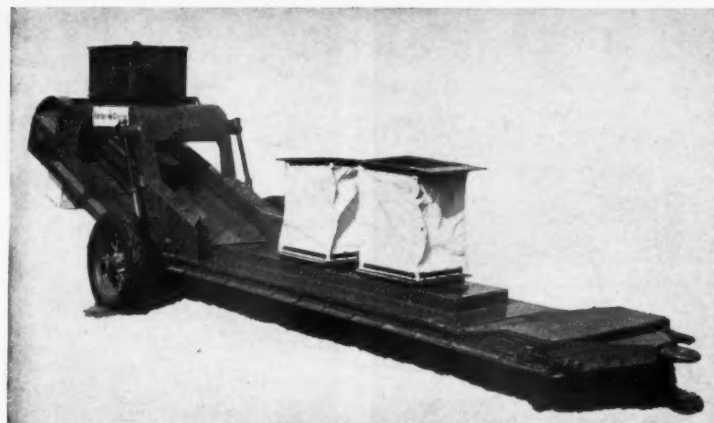
The American Steel Scraper Co.
SIDNEY OHIO

Adapts Car Unloader For Cement Handling

Accessories have been developed by the Barber-Greene Co., Aurora, Ill., for adapting its Model 358 under-car aggregate unloader and its Models 362 and 363 portable belt conveyors for handling bulk cement and other dry-batch materials.

The Model 358 car unloader has been fitted with complete metal covers for the under-car section as well as the up-run. Collapsible canvas spouts with metal stiffeners can be drawn up between the cross ties. The unloader should be operated in a shallow pit beneath the rails and attached to the hoppers of the cement car, Barber-Greene states. The discharge end of the unloader is equipped with a metal all-enclosed concentrating spout to direct the discharge into the conveyor hopper and to minimize dust.

The conveyor housing, which can be used on either the Model 362 or 363, encloses the entire length of the belt,



Barber-Greene's Model 358 under-car aggregate unloader is now equipped with cement-handling covers and spouts. Canvas spouts on the under-car section attach to hoppers on the cement car, making a dust-tight seal.

except for a small opening at the foot end. A concentrating spout, similar to that on the unloader, is fitted at the

head end to control escape of fines.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 572.

Multi-Use Transfer Pump

Literature on the Tran-Z-Fer all-purpose pump for transferring fluids from one container to another, or from a container to a fuel supply tank, is available from National Sales, Inc., 812 N. Main St., Wichita, Kans. The pump may be used to transfer diesel fuel, gasoline, gear lube, chassis lube, motor oil, kerosene, antifreeze.

The pump is designed for all-weather work and for handling fluids of different viscosities. The adjustable bung-hole adapter fits a standard 2-inch bung hole. The pump is equipped with 8 feet

of low-pressure oil-resistant hose and a 9-inch nondrip nozzle.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 574.

Fastening Specialties

A new 6-page illustrated catalog describing a complete line of fastening specialties for metal-to-metal and metal-to-wood applications has been prepared by South Chester Corp., 1418 S. Penn Square, Philadelphia 2, Pa. These products include drive rivets, adjustable pawl fasteners, anchor nuts, screw-type fasteners, and spring-grip fasteners. Line sketches show the method of grip for the various fastening devices. Tables indicate the styles and sizes offered.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 612.

News From Howe Scale

Two new branch offices in Denver and Houston, the nineteenth and twentieth for the company, have been opened by The Howe Scale Co. of Rutland, Vt. Daniel O. Ferris heads the one in Denver, at 2524 Walnut St., and Henry K. Leonard the one in Houston at 2215 McKinney Ave. Scales, Weightographs, weight recorders, and hand trucks constitute the Howe line.

George A. Seaver and William H. Leland have been named Managers of, respectively, the New York City and the Newark, N. J., branches of Howe. The company also informs us that it held another session of its sales-training school in St. Louis during January and February.

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Smooth clean pipe cuts with this **RIGID Cutter**

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PLANS CALL FOR CONCRETE COLUMNS?

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LAMINATED FIBRE FORMS

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3" to 24" I. D.
up to 25' long



Sonotubes save time, labor, lumber... reduce costs of concrete column construction. Cut to desired lengths on the job, they are light, easy to handle and require minimum bracing. Reinforcing beams or braces can be set in before pouring or placed in position after pouring.

Sonotubes provide perfect finished columns... are specially treated for easy stripping and leave a smooth, even surface that requires little polishing. Forms are for one-time use and can be left on if columns are not exposed.



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Research Board Holds 30th Annual Meeting

**The Effect of Truck Traffic on Test Pavement Is Reported:
Papers Review Developments in Highway Research**

• **ACCOMPLISHMENTS** in the vast field of highway research were reported on in detail at the 30th Annual Meeting of the Highway Research Board held in Washington, D. C., January 9-12. Of greatest interest to the nearly 900 engineers, educators, and officials of highway departments and member organizations in attendance was the report on Road Test One-Md. This report contained significant observations on the effect of heavy truck traffic for several months over a concrete test pavement in Maryland. The test was administered and supervised by the Highway Research Board under a cooperative arrangement with the Bureau of Public Roads and several member highway departments.

At the 4-day meeting held in the National Academy of Sciences and National Research Council Building, some 115 technical papers and reports on highway research subjects were given at 31 different technical sessions held both day and night. In addition, a symposium consisting of 38 papers on the subject "Frost Heave and Frost Action in Soil" was summarized in seven sections presented at two of the regular sessions. All the papers that were given represent the work of 74 different committees of the Highway Research Board.

The HRB award given for the outstanding paper presented at the last annual meeting was conferred on Roy E. Jorgensen, Deputy Commissioner and Chief Engineer of the Connecticut State Highway Department, and Robert G. Mitchell, Assistant Highway Engineer of the same organization, for their joint paper "Accident Analyses for Program Planning". Distinguished-service awards were presented to A. T. Goldbeck, Engineering Director of the National Crushed Stone Association, and F. V. Reagel, Engineer of Materials and Tests of the Missouri State Highway Department.

Road Test One-Md.

Roy W. Crum, Director of the Highway Research Board, opened the report of Road Test One-Md. with a brief description of the test, the principal object of which is to determine the relative effects, on a particular concrete pavement, of the four different axle loadings on two vehicle types. Information from this experiment will be used in appraising the load-carrying capacities of existing concrete pavements, in designing new pavements, and in framing equitable legislation to govern highway transportation operation. The test was conducted on a 1.1-mile section of concrete pavement on U. S. Route 301, 9 miles south of La Plata, Md. In its operation the test consisted primarily in comparing the relative effects on parallel adjoining lanes of RC pavement under test of two types of trucks, one type loaded to 18,000 and 22,400 pounds on single axles, and the other type loaded to 32,000 and 44,800 pounds on tandem axles. (See C. & E. M., Sept., 1950, pg. 10.)

The behavior of the pavement—divided crosswise and lengthwise into four sections—under loads was determined by measuring the rate of crack development in the concrete slabs, the amount of pumping along the free edge and in the joints, the road-surface roughness, the amount of slab settlement, and the strain and deflection of the slabs under load.

While all four sections were damaged by the loads applied, the 44,800-pound tandem-axle loads caused about eleven times as much cracking (linear feet) as the 32,000-pound tandem-axle loads, and the 22,400-pound single-axle loads caused about six times as much cracking as the 18,000-pound single-

axle loads. Pumping, road-surface roughness, and slab settlement were considerably greater in the section subjected to 44,800-pound tandem-axle loads than in the other three sections.

After 84,000 truck passes, 80 per cent of the joints in the section carrying 44,800-pound tandem-axle loads were depressed; whereas, with the same number of truck passes, only 10 per cent of the joints in the section carrying 32,000-pound tandem-axle loads were depressed. After 137,000 truck passes, 22 per cent of the joints in the section carrying 22,400-pound single-axle loads were depressed, while with the same number of truck passes, only 2 per cent of the joints in the section carrying 18,000-pound, single-axle loads were depressed. According to A. Taragin, Project Engineer conducting

the tests, traffic on the 44,800-pound tandem-axle section was stopped after four months of operations to keep that portion of the pavement from completely disintegrating. The other sections were tested for the full six months originally intended.

According to the report, after 238,000 truck passes, 28 per cent of the slabs in the section under 18,000-pound single-axle loads, and 64 per cent of the slabs under 22,400-pound single-axle loads contained cracks which have been analyzed as constituting structural failures due to the application of the test axle loads. Similar failures were found after 92,000 truck passes in 27 per cent of the slabs in the 32,000-pound tandem-axle test section, and in 96 per cent of the slabs under 44,800-pound

(Continued on next page)

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Chrysler Industrial 7—one of eight basic models.

Research Board Holds 30th Annual Meeting

(Continued from preceding page)

tandem-axle loads. Conversely only 4 per cent of the slabs in this latter section showed no such structural failures.

Soils

At one of the sessions on soils, M. N. Sinacori, Soils Engineer of the New York State Department of Public Works, presented a paper on the "Compaction of Unstable Material With Heavy Pneumatic-Tire Rollers". This paper summarized the test work performed by the New York State Bureau of Soil Mechanics at Binghamton, N. Y., using a Bros 50-ton pneumatic-tire roller at the site of a proposed arterial project. The unstable material was an old refuse dump that eventually provided an adequate subgrade.

Another soils paper given by L. John Minnick, Chief Chemist, G. & W. H. Corson, Inc., of Plymouth Meeting, Pa., and Richard H. Miller, Instructor in the Civil Engineering Department of the University of Pennsylvania, discussed "Lime-Fly Ash Compositions for Use in Highway Construction". Tests showed that small amounts of lime together with fly ash develop considerable strength when mixed with aggregates such as sandy soil, slag, and crushed stone. Good resistance to wetting and drying and freezing and thawing was also evident. Since compositions of this type are readily available in this country in enormous quantities at low cost, it is believed that these materials may be considered for use in the construction of the base course of highways. The use of calcium chloride was recommended for early strength, especially where freezing is expected.

Soils were linked up with maps and photographs in four different papers. Thomas H. Thornburn of the University of Illinois and J. R. Bissett of the University of Arkansas, in their joint paper "The Preparation of Engineering Soil Maps From County Agricultural Reports", suggested that civil engineers in the field consider such reports, since they utilize to the best advantage soils information already available. Aerial photographs are the only economical means of obtaining detailed area soil information, according to John C. Stevens of the Virginia Department of Highways in his paper entitled "Piedmont Soils Identified by Aerial Photographs". William F. Browning, Jr., of the Virginia Council of Highway Investigation and Research, gave a paper in which he detailed the procedure, methods, and results of the application of aerial photography to geologic mapping. A somewhat similar study, in a different part of the country, was covered by A. Morgan Johnson of Wayne University in his "Engineering Significance of Sand Areas Interpreted From Airphotos". In this instance the locale was a glaciated region of northwest Indiana, and the study covered the investigation of soils by the use of aerial photographs, and the interpretation, including both engineering soils mapping and analysis of highway problems, associated with the types of soils classified.

Design

"Recent Developments in Precasting of Highway Bridges and Structures" were discussed by R. B. McMinn, Bureau of Public Roads, in a design session. The writer concluded that if precasting is to take its proper place in the highway industry it will be necessary for bridge engineers to initiate projects, develop the details, and actually construct some precast structures. He suggested that contractors and concrete-products manufacturers should also cooperate, for their own benefit as well as for the good of the highway industry

as a whole.

In another design session, an open meeting was held of the Committee on Roadside Development at which two well known highway figures discussed general aspects of this specialized subject. Charles M. Upham, Consulting Engineer, reviewed "Twenty Years of Roadside Development" with particular emphasis on how it reduces maintenance costs and enhances highway safety. Roy E. Jorgensen, of the Connecticut State Highway Department, discussed the "Effect of Roadside Development on Highway Maintenance Costs". Taking the "hard-headed approach", as he termed it, Jorgensen posed several roadside problems for consideration, such as whether wider right-of-ways should be developed in view of increased maintenance cost of mowing. While stressing economy, the Connecticut engineer cautioned against ruthlessly cutting from the highway budget items that would endanger the complete highway.

(Continued on next page)

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At this same gathering, Nelson M. Wells, Principal Landscape Engineer of the New York State Department of Public Works, presented "Roadside Planting Design" in which he recommended certain study and research projects leading to the improvement of present highway-planting design practices. At another roadside-development session, Wilbur J. Garmhausen, Ohio Department of Highways, gave a comprehensive account of "Equipment for Roadside Development and Maintenance" with slides and photographs to illustrate new machines now being used in this work throughout the country.

Materials and Construction

"Michigan's Experience in the Use of White-Pigmented Membrane Curing Compound" was offered by C. C. Rhodes, Chemical Research Engineer of the Michigan State Highway Department. Some initial difficulty encountered in applying the compound with the spraying equipment then in use led to a modification of pump design by the manufacturer. Most operational troubles were caused by (1) inadequate stirring of the compound before and during application, and (2) failure to clean the spraying equipment properly after use.

The long-time effects of calcium chloride were submitted by Thomas E. Stanton, Materials and Research Engineer of the California Division of Highways, in his "Report on a Study of Calcium Chloride as a Strength Accelerator in Portland Cement Concrete, California Cements". Among the summarized results there was observed a very definite acceleration in compressive strength. In general the compressive strength of the concrete at all ages and conditions of cure was greater with than without CaCl_2 .

In his "Present Preferences for Traffic Paint", G. W. Ashman, Development Engineering Division of the New Jersey Zinc Co., disclosed that state highway departments have shown a very marked increase in the use of retroreflective-type road-marking paints. A general concern was indicated for paints with better service properties.

Maintenance

One of the most practical papers presented before the maintenance sessions was the work of O. L. Kipp, Chief Engineer, and C. K. Preus, Assistant Engineer of Materials and Research, Minnesota Department of Highways, entitled "Minnesota Practices on Salvaging Old Pavements by Resurfacing". It included details of typical sections, types of materials and proportions used, specification requirements,

traffic and cost data. The paper stated that while old, rough, deteriorated pavements can be restored to satisfactory riding quality by placement of thin bituminous mats of about 1 to 1½-inch thickness, these can be expected to remain satisfactory for only five to ten years without resurfacing if subject to fairly heavy traffic. For more permanent improvement, when the resurfacing is placed directly on the old slab, a minimum of two courses having a total thickness of 3 inches should be used.

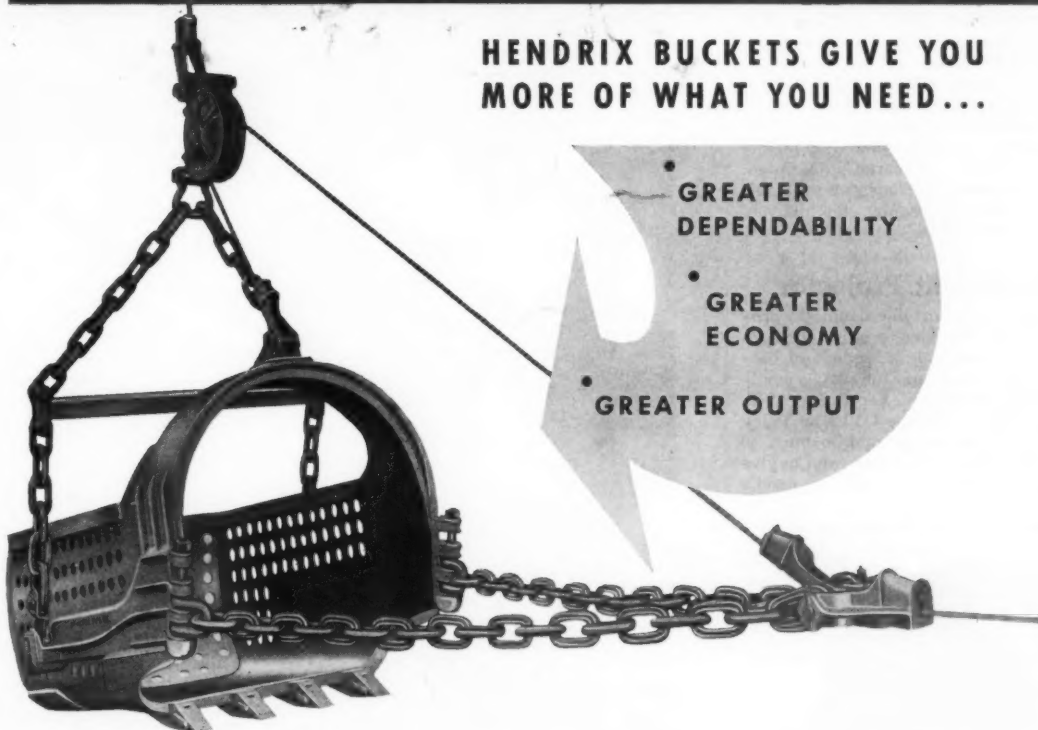
On pavements badly broken, cracked, or showing pumping tendencies, a gravel lift or base course at least 5 inches thick is put on before the bituminous covering. Surfaces placed on such gravel lifts retain their smoothness better and show less cracking than those placed directly on the concrete, even though the latter were the better areas of the slab at the time of reconstruction. Materials with excessive amounts of plastic fines were avoided in the granular lifts.

(Concluded on next page)



Three miles of extruded-aluminum pipe make up 7,200 feet of guardrail on Kansas City's Southwest Trafficway. A booklet issued by Reynolds Metals Co., 2500 S. Third St., Louisville, Ky., highlights the installation. To secure a copy, write to the company or use the Request Card at page 16. Circle No. 630.

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HENDRIX BUCKETS GIVE YOU MORE OF WHAT YOU NEED...

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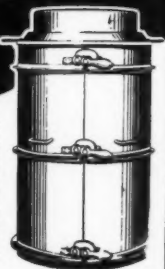
Operators in the field report they get more work done in less time at lower cost with HENDRIX DRAGLINE BUCKETS. The combination of the best materials and planned engineering by men with "know-how" results in a rugged, efficient-working dragline bucket that offers the operator greater dependability on the job, greater economy in maintenance and greater output for larger profits. Ask the man who operates one... he'll tell you!

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For making pipe by hand methods by either the wet or semi-dry processes. Built to give more years of service—sizes for pipe from 10" up to 120" and larger—tongue and groove or bell end pipe at lowest cost.

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Research Board Holds 30th Annual Meeting

(Continued from preceding page)

In widening operations, the subgrade was thoroughly consolidated before placing the base widening, which might be gravel, black base, or concrete. Where conditions permit, experience to date favors widening on one side rather than on both, from the standpoint of construction operations and performance of the finished surface. Asphalts in the blacktop have ranged from 85-100 up to 200-300 penetration.

Photogrammetry

"Photogrammetry and Its Uses in Highway Planning and Design" was covered in a paper by Curtis J. Hooper, Director of Traffic - Planning - Design, Connecticut State Highway Department, for a traffic-and-operations session. Hooper described photogrammetry as the process of converting photographs into contoured topographic maps. Its advantages are the ability to supplement existing survey personnel, the shorter time required to obtain maps useful for design, and costs no greater than slower ground surveys.

Formerly ground - survey methods were considered the only reliable means of obtaining accurate topographic information. It is now possible to develop topographic maps of specified accuracy by means of aerial photographs which are then subjected to a series of photogrammetric processes so that maps may be drawn at scales useful in highway location and design.

Research Funds Small

At the general session of the 4-day meeting, Chairman R. A. Moyer of the University of California declared that only one-half of one per cent of all highway funds is spent on research, in spite of the fact that "research is so important in reducing the total cost of highway transportation". Moyer disclosed that future road tests will be made on flexible-type pavements similar to the test just completed on a concrete highway. "Research", he stated, "will help solve the current problems that are encountered by the highway engineer in the field."

Floodlight Projector

A completely portable floodlight projector, with no cables or other obstructions and entirely independent of batteries, generators, and the like, is available from William W. Lee & Son, 20 E. Jackson Blvd., Chicago 4, Ill. The Tilley floodlight projector is said to burn 40 hours on 6 pints of kerosene and to give a light of 5,000 mean reflected candle power.

According to the manufacturer, it is



The Tilley portable floodlight projector, Model F. L. 6, burns kerosene and gives a light of 5,000 mean reflected

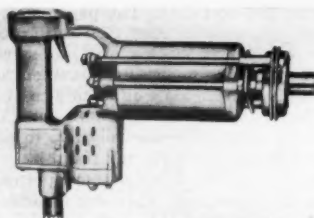
wind and rainproof and is reliable for standard or emergency uses. This Model F.L.6 floodlight is complete with a short stand and has an overall height of 26 inches. Its total weight is 27 pounds.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 607.

A New Hammer Drill

An electromagnetic hammer drill, Model No. 10-Ro, for high-speed hole drilling in concrete, brick, and stone, has been announced by Syntron Co., 227 Lexington Ave., Homer City, Pa.

The automatic rotation of the carbide-tipped spiral drill speeds up hole drilling, eliminates manual turning of



For high-speed hole drilling in concrete, brick, and stone—Syntron's No. 10-Ro electromagnetic hammer drill.

the drill chuck, and reduces fatigue, the manufacturer claims. The automatic rotation of the drill bit is accomplished by a rubber ratchet mechanism actuated by the recoil of each blow of the hammer's piston (3,600 blows per min-

ute). The hammer weighs 11¼ pounds and may be used for one-handed drilling in awkward places.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 600.

Shunk Personnel News

Shunk Mfg. Co. of Bucyrus, Ohio, has announced two recent appointments. J. Austin Carrington is now Director of Sales, and Walter A. Wind has been made Assistant to the General Manager. Mr. Carrington was formerly a marketing and distribution executive with General Electric and Mr. Wind left a position as production consultant to the Vermont Bureau of Industrial Research to come to Shunk.



PULLING A 17-YARD SCRAPER, the TD-24 more paydirt in a faster time cycle to keep Highway Wondra ahead of the contract time clause on Minnesota State Aid Road Number 9, near Clinton Falls, Minnesota.



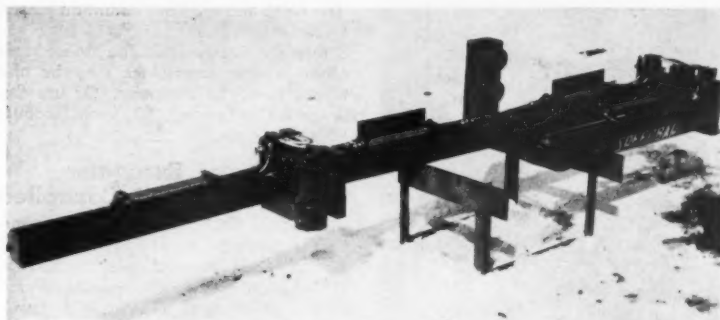
IT'S "THE CHAMP"—the big red International—and here's what R. E. Highum says about it: "The quick-starting engine gets our equipment working each day. Over a period of time that means a lot of profit for us. Economy in fuel, lubrication, and repair good. International parts delivery and service are



Circulating Spraybar

A new constant-circulating spraybar, manufactured by H. R. Erickson Machine & Mfg. Co., is distributed by Frawley Equipment Co., 2430 Wycliff St., St. Paul 4, Minn. Patented features of the Erickson Speedbar include large-capacity tapered plug-type valves located inside the spraybar itself, which will not freeze, the company says, regardless of atmospheric conditions. A positive pressure balance—accomplished by the confluence of material from both ends, at the center of the bar—produces the same outage at all nozzles, regardless of their location in the spraybar, the company states.

The 12-foot bar is manufactured with the 6-foot center section solid and the



Positive pressure balance and tapered plug-type valves that will not freeze feature the Speedbar circulating spraybar for bituminous distributors.

two 3-foot extensions mounted on joints which swing on a horizontal plane. Circulation is complete to the extreme ends of the bar at all times, whether the

extensions are opened or folded, the company says. This feature allows for the tandem application of bitumen if desired. The Speedbars may be obtained in various lengths, and are readily adaptable to all road-oil distributors, according to the manufacturer.

Four double-acting air rams—each ram actuating the valves in one 3-foot section—provide independent control of any section or combination of sections. Air-control valves within the reach of the truck driver permit one-man control.

Further information may be secured from Frawley. Or use the Request Card at page 16. Circle No. 609.

A Concrete-Surface Protective Coating

A new protective coating for concrete and masonry surfaces has been developed by The Holms Co., 2468 N. 19th St., Milwaukee 6, Wis. Versatall concrete sealer is designed to provide a tough, resilient surface coating which will protect concrete or masonry from the deteriorating effects of sun, rain, frost, and other weather conditions. It is also said to resist the action of acid and caustics.

Versatall may be applied by swabbing or spraying methods. It is available in various colors and as a crystal-clear compound. All colors are said to resist the fading effects of sun and lime.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 613.

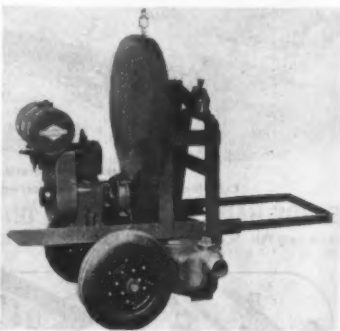
Lightweight Pumps Handle Muddy Water

Two new lightweight Mud Hog diaphragm pumps have been developed by Marlow Pumps, Box 556, Ridgewood, N. J. Weighing half as much as other Marlow Mud Hog pumps, they can be lifted on and off trucks by two men and wheeled around the jobs by one man, the company says.

Primarily intended for seepage control and ditch work, the lightweight Mud Hog will lift from levels 25 feet below itself and handle soil-laden liquids. The 2-inch Model 202 Mud Hog has a capacity of 2,100 gph; the 3-inch Mud Hog Model 302 will pump up to 3,200 gph. Both models are mounted on a rigid steel chassis equipped with 12 x 3.00 hollow-cushion rubber tires.

The pumps are powered by a 2-hp Model 8-R6 Briggs & Stratton engine, equipped with a 6 to 1 geared speed reduction. Power is transmitted to the pump crankshaft by an oil-lubricated chain drive. The chain drive has an adjustable tensioning device and is protected by a guard. The crankshaft is connected by an adjustable steel shaft to a standard No. 3 diaphragm. The diaphragm is made of a newly developed rubber and fabric composition designed for a long service life.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 570.



Designed for seepage control and ditch work, the new lightweight Mud Hog diaphragm pump will lift from levels 25 feet below itself.

Up in the land of ten thousand lakes, the International TD-24 is doing a job of moving paydirt that would make any contractor sit up and take notice.

Highum and Wondra, Blooming Prairie, Minnesota, on a state road improvement contract, are a hundred percent for International—and here's why:

The TD-24 on the job rolled up 1,500 hours its first year with no downtime and not a cent for repairs.

Quick, all-weather starting—with International's exclusive push-button, gasoline-conversion starting system—gets equipment working sooner each day—doubly important where the snow flies early and stays late.

TD-24 hauls a bigger payload with a shorter time cycle—does more work with more speed.

Synchromesh transmission—you shift "on-the-go."

Planet Power steering with finger-tip control for pivot turns, feathered turns, turns with power on both tracks.

Reserve engine torque control—gives more lugging ability and increased drawbar pull for overloads.

Power—TD-24 delivers 148 maximum horsepower at the drawbar.

Ask the superintendents and the "skinners" on any TD-24 job. Ask to take the controls yourself. Then let your International Industrial Distributor show you what's in the TD-24 for you. You'll be a TD-24 man from then on in.

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILLINOIS



INTERNATIONAL CRAWLERS MAKE SNOWTRAPS—deep snow ditches to keep the highway from drifting over in winter. A TD-9 and two TD-18's are on this job. One TD-18 has 4,500 hours in three years, the other has 9,600 hours in four years!

Clean, Quick Shave for the face of Minnesota

How one contractor
closes the work-gap
with the TD-24



INTERNATIONAL

POWER THAT PAYS



Ball-Joint Design For Dredge Pipeline

The Paceco ball joints, a product of the Pacific Coast Engineering Co., Oak and Clement Sts., Alameda, Calif., are designed for use on dredge pipelines. They offer the strength of steel and can be used with pipe lengths of up to 100 feet, the manufacturer reports. Working pressures may now be boosted from 30 to 150 pounds. Since connections can be made in as little time as 3 minutes, the joints reduce connecting time and work stoppage, according to the manufacturer.

The new design of this joint shrinks the ring on the ball. Balanced hook bolts on the socket can be made up at any point on the circumference of the ring. This, the company points out, enables easy assembly even in rough weather. There is a cotter on the threaded end so that the nut cannot be screwed off accidentally and perhaps lost. The opposite end of the lug is so large that it cannot go through the hole



The Paceco ball joint. A cotter key on the threaded end prevents the nut from being screwed off accidentally. The other end of the lug is so large that it cannot go through the hole in the socket. Moreover, the lug can fit over the ball end anywhere in the unobstructed groove.

in the socket. There are no loose parts to fall overboard, since the bolts are hinged and are never removed in assembling or disassembling the joints.

HAISS Material Handling BUCKET LOADERS



FOUR MODELS

Load 3 to 8 Yards per min

SELF-PROPELLED SELF-FEEDING

For loading: sand, gravel, stone, topsoil, coal, snow and similar materials. One man operation, wheel or crawler mounted. Furnished with swivel chute or with swivel belt conveyor.

Special new features include: Sealed anti-friction bearings on head and tail shafts, two or four wheel drive, hydraulic raising and lowering, manganese or roller chain.

HAISS CONVEYORS CAR UNLOADERS



FLAT and TROUGH BELT CONVEYORS
For handling all types of loose or package materials. Mounted on "V" or mast truck with swivel wheels or for permanent installation.



UNDERCAR UNLOADERS
Designed and built especially for loading sand, gravel, and crushed stone. Combination belt and positive chain drive. Capacity up to 5 tons per minute. Ask for bulletin No. 501.



SECTIONAL CONVEYORS
Channel or Lattice Frame construction. Made in easily assembled standard sections for permanent or portable installation. All sizes and capacities available for handling all types of aggregates as well as bagged or packaged materials.

For further information write, 'phone or wire.
Experienced Hais Representatives are located in all principal cities.

GEORGE HAISS MFG. CO., INC., Division of PETTIBONE MULLIKEN CORP.
141st to 144th St. on Park Ave., NEW YORK 51, N. Y. 4700 W. Division St., CHICAGO 51, ILLINOIS
Phone Mott Haven 5-2200 Phone Spaulding 7-9200



The bolts and nuts are cadmium plated to resist corrosion.

Further information on these and other dredge accessories may be obtained from the company. Or use the Request Card at page 16. Circle No. 591.

Diesel-Power Excavator Is Fully Air-Controlled

Bulletin 402 prepared by Marion Power Shovel Co., 617 W. Center St., Marion, Ohio, recommends the Marion 111-M excavator for continuous service in heavy digging. This unit features the Ward-Leonard electric swing and Marion air control. It is designed to work with a 4-yard shovel and a 30-foot boom, or, for long-range work, a 3½-yard shovel bucket with a 43-foot boom. It also converts to a 5-yard dragline with an 80 to 100-foot boom, or to clamshell or crane operation.

The 12-page booklet gives complete design and performance data on the 111-M, including electric swing, air control, operating machinery, frame, and machine assemblies. On-the-job photographs show the excavator performing a variety of work. The bulletin also contains condensed specifications.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 551.

Correction: Curing Compound

In our story on the new state hospital for Shreveport, La.—page 19 in the December, 1950, issue—we said mistakenly that Hornite compound was used for concrete curing. The product actually used was Hornure, made by A. C. Horn Co., 10-10 44th Ave., Long Island City 1, N. Y.

Persons Is Lincoln V. P.

W. R. Persons has advanced from the position of General Sales Manager for The Lincoln Electric Co., Cleveland, Ohio, to that of Vice President in Charge of Sales. He joined the company in 1934 as a welding engineer.

RUEMELIN BLAST GENERATORS

FOR CLEANING BRIDGES — WATER TOWERS — STRUCTURAL STEEL

Many contractors use Ruemelin Blast Generators for cleaning steel work to remove rust, paint and scale before repainting. These machines are also used to remove laitance from concrete wherever concrete construction is in progress. A wet adapting nozzle can be furnished to convert dry machines to wet type of operation. Built in several sizes.



Write for Bulletin 35-B

RUEMELIN MFG. CO.

3868 N. Palmer St., Milwaukee 12, Wis.
Manufacturers and Engineers
SAND BLAST AND DUST COLLECTING
EQUIPMENT, WELDING FUME COLLECTORS

Save... switch to WARSOP drills and breakers

It's real economy

- ★ Low Initial Cost
- ★ Low Maintenance Cost
- ★ Low Operating Cost
- ★ Low Transportation Cost

No Battery • Positive Dual-Fan Cooling
Variable Speed Control • No Springs
Completely Self-Contained



WARSOP
S 6 BREAKER

WARSOP
ROCK DRILL

There's real Savings when you use Warsop Portable Rock Drills and Breakers on all types of construction and demolition work. With Warsop hard-hitting power tools you need no cables, no hose. Compact and light in weight, they are easily transported from job-to-job. Wherever you have breaking or drilling jobs that require only one or two machines figure to use WARSOP. You'll save time, labor and equipment costs.

Write for descriptive folders and specifications.

WARSOP POWER TOOLS, Inc.

Mailing: P. O. Box 1809, Wilmington 99, Del.

Plant: New Castle Airport, New Castle, Del.

Warsop
PORTABLE DRILLS—BREAKERS
self-contained—gasoline engine driven

ARBA Rededicated

The Board of Directors of the American Road Builders' Association has adopted a statement rededicating the 48-year-old organization. The statement pledges the ARBA to the promotion of a highway program on a scale justified by sound engineering and economics, and in line with the requirements of traffic, safety, the national economy, and defense. It advocates sound highway planning and the use of improved techniques in engineering, construction, finance, and administration; the continuation of Federal Aid for highway construction, including the development of primary routes, urban arterial highways, a national system of interstate highways, and secondary roads.

The statement made it clear that the ARBA will continue to oppose diversion of highway revenues to nonhighway purposes and will try to strengthen the existing Federal prohibition of such diversion. The organization will continue to urge the use of the contract method in highway construction; to promote highway safety; and to better inter-industry and professional relationships as well as relationships between various government agencies.

It also intends to foster the training of student highway engineers, and the practical application of research findings, and to expedite the Inter-American Highway. The statement urges additional provision for the interchange of information and the broadening of relationships within the highway industry and profession, and the maintenance of a sound public-relations program.

Maintenance-Costs Bulletin

The Highway Research Board has published a bulletin on maintenance costs which contains a progress report of the Committee on Maintenance Costs and a paper sponsored by this Committee. Both the paper and the report were presented at the 29th Annual Meeting of the Board in 1949.

The report, by H. A. Radzikowski, Chairman of the Committee, discusses the cost trend of such maintenance and operation items as labor, material, equipment, and overhead. The need for the correlation of design to maintenance costs on such operations as ditch cleaning, roadside mowing, and snow removal is stressed.

The paper, by Roger H. Willard, County Roads Engineer, Frederick County, Maryland, deals with the maintenance and operation costs of the county road system in Frederick County. Total maintenance costs per mile for macadam, stone, and dirt roads are included. The percentage of total maintenance expenditures for labor, material, and equipment are given for each type of road and for bridges and snow removal.

Bulletin No. 29 may be obtained from the Highway Research Board, National Research Council, 2101 Constitution Ave., Washington 25, D. C. It costs 30 cents.

Office on Wheels

Putting the construction industry on wheels, which has been proceeding apace, is now affecting the field office in a big way—at least for F. H. McGraw & Co., engineers and constructors of New York, Hartford, and Chicago. The firm is rapidly converting trailers into field offices complete with built-in desks, cabinets, heating systems, showers, and toilet facilities.

McGraw's most recent trailer purchase is an Elcar de luxe model which came equipped with sink, sofas, refrigerators, and other home conveniences. The home conveniences were replaced with more utilitarian office equipment; shelves, cabinets, and desks were built



The construction shanty will soon be a thing of the past. Modern construction companies have taken to wheels, using trailers like this one recently put in service by F. H. McGraw & Co. for field offices.

in. McGraw feels that the trailer will pay for itself on the second job. Its transportation is not a cost item since it can be attached to any car or truck. The pickup truck equipped with small tools, which McGraw usually sends to a new job, hauls the trailer.

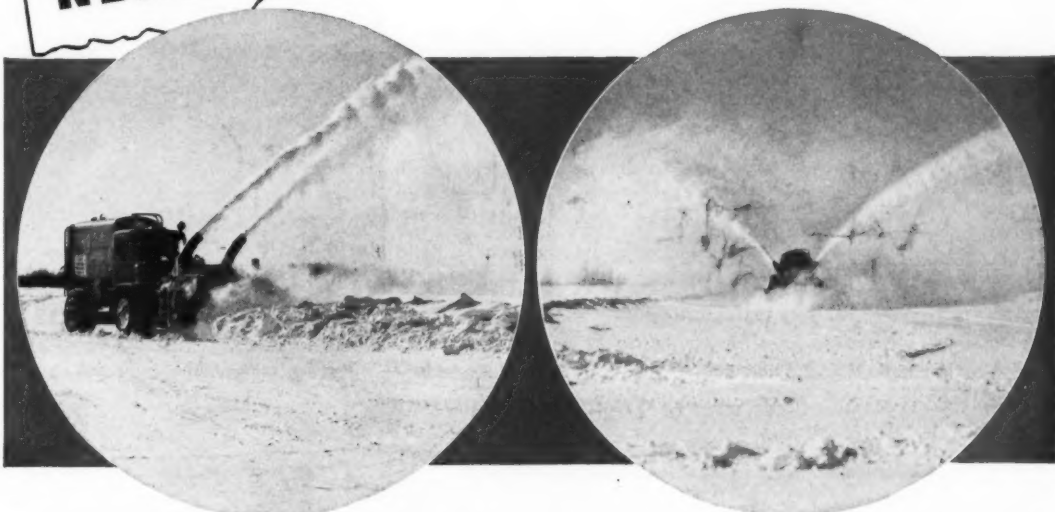
James Grady, McGraw Superintendent on a power-plant project at Norwich, Conn., reports that his trailer is easily the most adequate as well as the most comfortable field office he has ever had.

Detroit Names Armentrout

Larry Armentrout is now Eastern Regional Manager for Detroit Automotive Products Corp. He is in charge of the distribution, sales, and servicing of Thornton drives, Load-Booster third-axle units, and NoSpin differentials through the company's distributor outlets in New York, New Jersey, Connecticut, Massachusetts, Vermont, New Hampshire, Maine, Rhode Island, Maryland, and Delaware.

BIG NEWS!

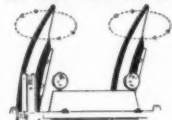
GREATER SNOW STREAM CONTROL with New BROS "Complete Circle" Casting Chutes



Bros Sno-Flyer rotaries equipped with new 360° rotating casting chutes at work. Left, casting windrowed snow up to 150 feet. Right, traveling 15 m.p.h. casting fresh snow to right and left, with chutes aimed to take advantage of wind direction. Notice how clearly operator can see. No "fuzzing" of streams.

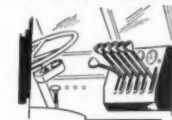
4 POINTS TO REMEMBER 4

POSITIVE CONTROL IN ANY DIRECTION



1. Chutes ride smoothly on ball bearings, under positive control from cab. Motor is hydraulic-driven. Each chute can be rotated in a full circle.

OPERATOR HAS FINGERTIP CONTROL



2. From a simple, well-designed control bank in the rotary cab, the operator has positive hydraulic control over chute action and plow operation.

RAISE OR LOWER SNOW STREAM ARC



3. Operator can change angle of each chute to cast high or low, missing nearby objects, and to take better advantage of wind. Each chute adjusts individually.

HINGED DOOR FOR QUICK ACCESS



4. Door can be opened while casting wet or heavy snow to help relieve snow pressure. Easy to clean chutes. Take-off and re-mounting is simple.

NOW YOU CAN CAST SNOW EXACTLY WHERE YOU WANT IT

Apparently winter snowfalls are becoming more and more irregular. Vehicle traffic is increasing steadily. Highway engineers and officials are finding a greater need for proper snow placement and less handling.

A rotary operator has been handicapped by rotary design limitations. He cannot efficiently control his snow streams to take advantage of all wind directions. Insufficient control has meant plugged side lanes, blocked intersections, damage to buildings and property, and additional handling costs.

Now, for the first time, 360° all-directional snow stream control is available with the new hydraulically controlled casting chutes designed by Bros for Sno-Flyer rotaries. The operator can aim these tubular chutes in any direction, together or separately.

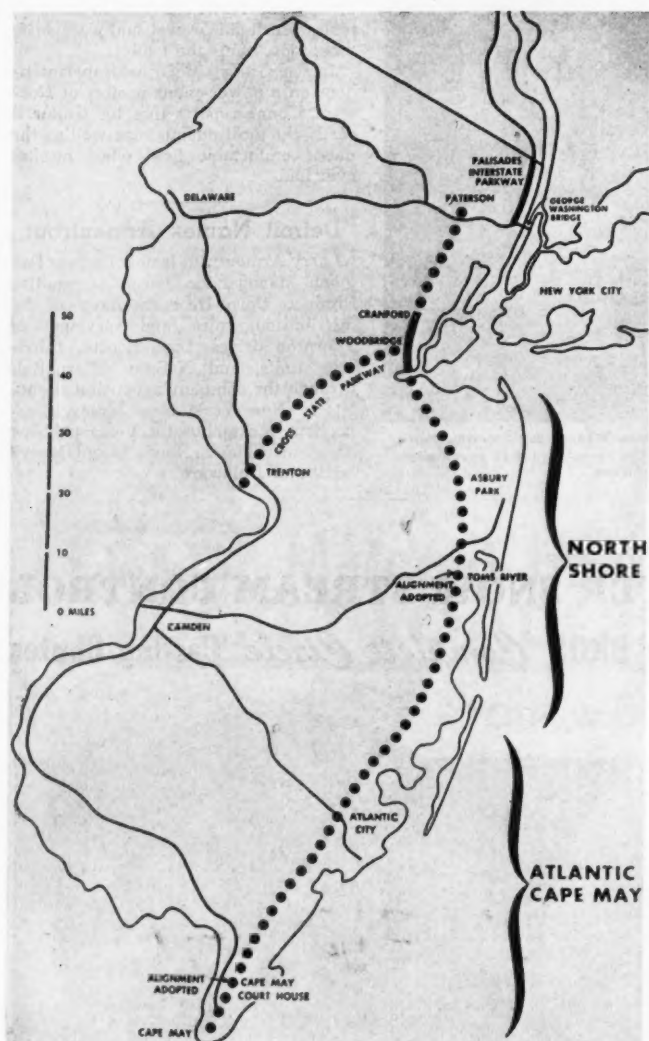
You can't top this snow handling combination: Big capacity plus positive snow stream control, with a Sno-Flyer rotary and Bros all-directional chutes! Write today for information.

WILLIAM
BROS

BOILER & MFG. CO.

Minneapolis 14, Minnesota

New Jersey's First Parkway



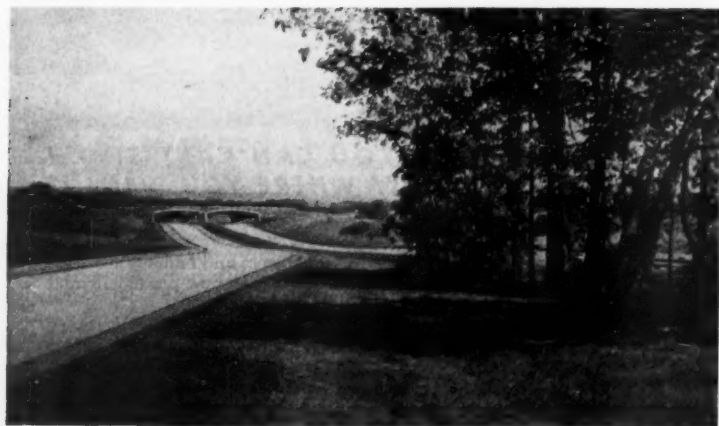
The general location of Route 4 Parkway in relation to the state of New Jersey.



Section 5 of the Parkway, looking north from Madison Hill overlook and picnic area.



See how contour grading has fitted the new roadway into the surrounding countryside.



Existing growth was preserved by varying the width of zone between opposing lanes.



These stabilized turf shoulders are for emergency stops and repairs.

New Jersey Highway Department Photos



Structures are designed to merge naturally with the adjacent landscape.



Madison Hill and one other picnic area have been built along the first parkway section.

A Complete Modern Highway

Wide Right-of-Way. Contour Grading, and Preservation of Existing Growth Are Some of Its Design Features

By OLIVER A. DEAKIN, Parkway Engineer, New Jersey State Highway Department

• NEW JERSEY'S First Parkway, Route 4, was officially opened to traffic last June 23 by Governor Alfred E. Driscoll and former State Highway Commissioner Spencer Miller, Jr. The last portion of the first 10-mile section was opened by Ransford J. Abbott, State Highway Commissioner, on November 1, 1950.

Started in 1947, Route 4 Parkway, we believe, is an excellent example of the results obtained by coordinated efforts of highway engineer, bridge engineer, soils engineer, and parkway engineer in the design and construction of the complete modern highway facility for moving passenger traffic rapidly, safely, and comfortably.

The parkway is planned to extend from the City of Paterson to Cape May in a north-south direction for 160 miles. When completed, it will furnish the motoring public with an urgently needed new route, serving the metropolitan cities of the northern part of the state as well as providing easy access to the popular seashore resorts.

Use of Aerial Photos

In the design and location of the Parkway, every advantage was taken of the latest methods of aerial photography. Aerial mosaics at a scale of 1 inch equals 800 feet were used for general alignment studies. Mosaics at a scale of 1 inch equals 400 feet were used for more detail and final alignment and design studies.

Aerial topographic surveys were also made of the parkway alignment after the route was fairly well established, at a scale of 1 inch equals 100 feet, with a 2-foot contour interval. Aerial obliques were used extensively in studying landscape treatment of traffic interchange areas. In establishing parkway

(Continued on next page)



New Jersey Highway Department Photo

An entrance road to a gasoline-station area. There are three such areas, for four stations, on the first parkway section.

How a TIMKEN® bearing equipped hoist drum helps raise yardage

WITH Timken® bearings on the hoist drum shaft, this Marion 151-M shovel needs less time out for maintenance and repairs. That means it's available for more hours of work—to help you increase your yardage records.

Lending a hand, too, are the Timken bearings on the intermediate hoist shaft, the motor extension shaft, the first intermediate propel shaft, the boom hoist worm shaft and boom point sheaves.

Timken bearings reduce maintenance time by (1) keeping shafts in rigid alignment, (2) maintaining correct gear center distances, making gears quieter and minimizing gear wear, (3) permitting tighter closures that retain lubricants better and keep dirt out, (4) lasting, normally, the life of the machine.

Timken bearings take the heaviest loads, thanks to line contact between rollers and races. They take radial, thrust and combination loads, because of their tapered con-

struction. Their true rolling motion and extremely smooth surface finish practically eliminate friction.

For an extra measure of long, trouble-free operation in the machines you make or use, specify the bearings with the trade-mark "Timken". The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO".



This symbol on a product means its bearings are the best.



MARION POWER SHOVEL CO. uses Timken bearings on this hoist drum shaft and five other vital shafts for smooth, dependable performance with less maintenance.

NEW IMPROVED! CANCAP automatically protects tractor exhaust systems from damaging rain, sleet and snow...

New Wider Opening Action - Allows Unrestricted Exhaust Gas Escape.

Lightweight Cast Aluminum Cap Opens with First Puff Of Exhaust.

New, Long Wearing Malleable Iron Hinge Insert Built Right Into Lightweight Cast Aluminum Cap.

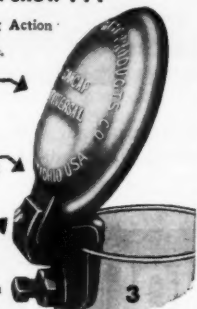
Cadmium Plated Locking Screw With Shakeproof Washer Insures Longer Life.

PROMPT DELIVERY

At Dealers Or Order Direct From

CANTON CAST PRODUCTS CO.
2400-13th St. N.W.
Canton, Ohio

makers of the CANTON TENSION PULL LOAD BINDER

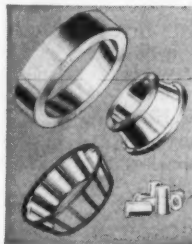


3 SIZES FIT ALL EXHAUST PIPES FROM 1 1/2" to 4 1/4"

NO. 2 CANCAP - fits all exhaust pipes from 1 1/2" to 2 1/2" - \$1.90 ea.

NO. 3 CANCAP - fits all exhaust pipes from 2 1/2" to 3 1/2" - \$2.25 ea.

NO. 4 CANCAP - fits all exhaust pipes from 3 1/2" to 4 1/4" - \$2.75 ea.

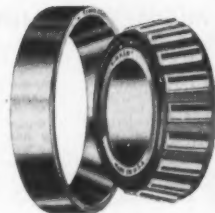


DESIGN LEADERSHIP

The first Timken tapered roller bearing was produced in 1898. Since then the one-piece multiple perforated cage, wide area contact between roll ends and ribs, and every other important tapered roller bearing improvement have been introduced by The Timken Roller Bearing Company.

The Timken Company leads in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis steels.

TIMKEN
TRADE MARK REG. U.S. PAT. OFF.
TAPERED ROLLER BEARINGS



NOT JUST A BALL NOT JUST A ROLLER THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION



New Jersey Highway Department Photo

Topsoll is placed on the stabilized turf shoulder of the highway.



New Jersey Highway Department Photo

Hay mulch assures a good growth of shoulder turf out of recognized seeding periods.

New Jersey Parkway — A Modern Highway

(Continued from preceding page)

right-of-way limits, aerial mosaics were very helpful and a great time-saver.

General Design

Route 4 Parkway is designed as a limited-access type of express highway with landscaped borders. The right-of-way varies in width from a minimum of 300 feet to a maximum of 500 feet. Right-of-way lines were established at tops of slopes, in back of wooded areas, and on far sides of streams wherever possible, in order to preserve all existing natural landscape features of recreational and scenic value.

Ultimately there will be six 12-foot traffic lanes, although only four 12-foot lanes were paved initially. The medial zone is 30 to 90 feet wide on the first 10-mile section. There is a 3-foot penetration-macadam shoulder on the medial-zone side of the pavements. On the outside of pavement there is a 10-foot shoulder for emergency repair of breakdowns and occasional stopping; it consists of a 3-foot transition strip and 7 feet of stabilized turf shoulder.

Contour Grading

All grading has been done in accordance with contour-grading plans and cross sections, so that the roadway closely fits the existing topography. Newly made cuts and fills are blended and warped into the surrounding terrain more easily by contour-grading methods.

All fill slopes up to 10 feet high have

been flattened to 4 to 1. This will reduce maintenance costs because of the smaller mileage of guardrail to maintain through the years ahead. Also, mechanized equipment can mow flat roadside slopes easily and rapidly; streamlined cross-section design has

almost eliminated costly hand-labor methods in maintenance.

Moreover, the variation and blending of slopes into existing terrain by contour grading increases safety by helping to maintain normal driver reaction; it relieves fatigue due to the

monotony of a typical uniform cross section of highway designed with long tangents, with mechanically standardized $1\frac{1}{2}$ to 1 slopes, and a straight clearing line of existing growth left on either side of the travelway.

(Continued on next page)

Russell M. Young reduces costs 15%

YARDS 7-9506
830 WEST 38TH ST

CHICAGO 9, ILLINOIS

RUSSELL M. YOUNG
NOT INC
MOTOR TRUCKS
FOR HIRE

November 4, 1949

Mr. R. B. McFarland, Mgr.
Standard Oil Company
20 North Wacker Drive
Chicago 80, Illinois

Dear Sir:

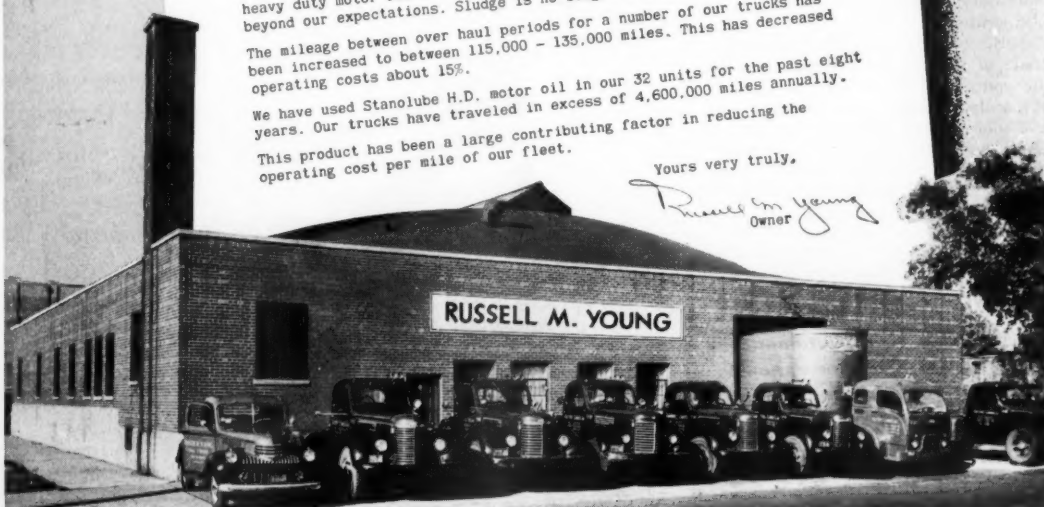
As a middle western fleet operator, we of Russell M. Young Co. feel we can recommend Stanolube H.D. motor oil very highly. This high quality heavy duty motor oil has increased piston ring and bearing life far beyond our expectations. Sludge is no longer a problem in our fleet.

The mileage between over haul periods for a number of our trucks has been increased to between 115,000 - 135,000 miles. This has decreased operating costs about 15%.

We have used Stanolube H.D. motor oil in our 32 units for the past eight years. Our trucks have traveled in excess of 4,600,000 miles annually. This product has been a large contributing factor in reducing the operating cost per mile of our fleet.

Yours very truly,

Russell M. Young
Owner



THE benefits reported by Mr. Young are typical of those obtained by operators of all types of automotive equipment — trucks, buses, tractors, taxis — when STANOLUBE HD has been used.

Long mileage between overhauls and low operating costs result when engines are kept clean and free from deposits with STANOLUBE HD. Clean ring grooves and free rings mean longer, full-power operation with STANOLUBE HD.

Whether you have a particular lubrication problem or are simply looking for greater fleet economy, a Standard Oil Automotive Engineer can help you. He offers you the finest automotive fuels and lubricants on the market. He has the practical experience and specialized training to help you obtain the maximum benefits from these prod-

ucts. Arrange for his visit, now, by writing to: Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

STANOLUBE HD
REG. U. S. PAT. OFF.
Motor Oil

STANDARD OIL COMPANY (INDIANA)



THE ANSWER TO THE ENGINEER'S PRAYER

BREAKS
CONCRETE
FASTER

TAMPS BACKFILL
BETTER AND FASTER
FOR LESS



THE NEW, MORE POWERFUL

MIGHTY "B" MIDGET

Fastest Pneumatic Concrete Breaker and Backfill Tamper. Replaces all the dirt removed after pipe has been laid. Gives you high density compaction. Ready to repave immediately. No temporary paving. No spoil dirt to haul away. Due to high density compaction, requires little asphalt in replacement. Cuts cost of tamping and breaking of concrete many times. Can be worked manually or automatically. 160' Compressor for full capacity or 105' Compressor for $\frac{1}{2}$ capacity. For further particulars, see your nearest dealer, or write Department C.

R. P. B. CORPORATION

2751 East 11th Street Los Angeles 23, California



New Jersey Highway Department Photo

Lane-separation pavement of Belgian block on the parkway terminates in a corrugated singling concrete separator.

Medial Zone

The medial zone on the first 10-mile section varies in width—as well as in elevation—from a minimum of 30 feet to a maximum of 90 feet, according to the existing topography and the type and aesthetic value of the native woodland growth encountered.

By varying the width of the medial zone as well as the profile of each roadway, the amount of damage to the existing terrain and wooded areas has been kept to a minimum. Many desirable native trees and shrubs were salvaged from open farm fields during the first stage of construction and transplanted to permanent locations as part of the overall landscape development plans for the parkway.

Shoulders

On the first 10-mile section of the parkway, 71,956 square yards of stabilized turf shoulders were constructed at an average price of \$1.43 per square yard. Some 45,565 square yards of hay mulch were applied to assure good growth of turf out of regular recognized seeding periods. This type of shoulder will reduce maintenance costs as well as improve the appearance of the parkway.

Structures

A great deal of study was given to the architectural design of parkway bridges, guardrail, headwalls, pedestrian footbridges, lighting standards, and directional signs. Insofar as possible, these structures were designed to merge naturally with the adjacent landscape.

Bridges were constructed of stone wing walls and exposed-steel spans painted foliage green wherever this type of bridge fitted the site, while entirely stone-faced structures were designed for other locations. Simplicity of architectural treatment was stressed in the design of all parkway bridges.

Where 4 to 1 slopes had been used, no guardrail was necessary, as mentioned earlier. On all embankments 12 feet high and over, low rough-sawn timber guardrail was used. The precast-concrete posts for this guardrail are colored brown with Keramik concrete stain to match the creosoted-timber rails.

Footpaths, Picnic Areas

In the design of the parkway the best use of the land included within the right-of-way was carefully considered. Pedestrian footpaths 6 feet wide, surfaced with 2 inches of crushed limestone, were constructed adjacent to highly developed suburban areas and at least 50 feet from the traffic lanes.

Two picnic areas have been built to provide a place on the parkway where the motorist may safely stop, rest, relax, and eat. Facilities such as tables, fireplaces, toilets, and water are planned. Parking areas for 14 to 16 cars have been provided and paved with bituminous concrete. Deceleration lanes 600 feet long into the picnic areas

and acceleration lanes 1,000 feet long at exits have been constructed for the safety of vehicles leaving and entering the main traffic lanes on the parkway.

Service Facilities

Four gas-station lots 100 x 180 feet have been laid out at three service-station areas. Individual lots have been sold to the highest bidder, and at present three different gasoline companies are building stations at two areas. Adequate entrance and exit roads have been designed and constructed by the State Highway Department. The design of the stations is in the contemporary architectural style, using local stone and other construction materials that harmonize with the surrounding countryside.

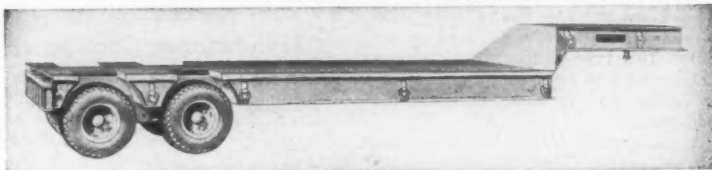
Other Design Details

Much attention and thought was devoted to improving the appearance of such areas as those left untreated under bridge structures, where it is im-

(Concluded on next page)

SOLVE YOUR HAULING PROBLEMS WITH A "TRANSPORT TRAILER"

Capacities through 75 Ton—Semi and Full Trailers



CARGO CARRIER MODEL GPX (Semi) with Tandem Axles

PATENTED TANDEM AXLE ASSEMBLY—Featuring unusual lengthwise and side-wise wheel accommodation to irregularities in the road. Use of full width tubular, forged, heat treated axles with CAMBER.

FRAME—Constructed of beam sections throughout, electric welded. A ruggedly strong and efficient unit with minimum weight.

TRANSPORT TRAILERS, INC.

TRANSPORTATION ENGINEERING A SPECIALTY
CEDAR RAPIDS, IOWA, U.S.A.

1. It's FASTER!
2. It's CHEAPER!

—Two BIG Reasons Why The BARCO Rammer is the answer to your SOIL COMPACTION PROBLEMS



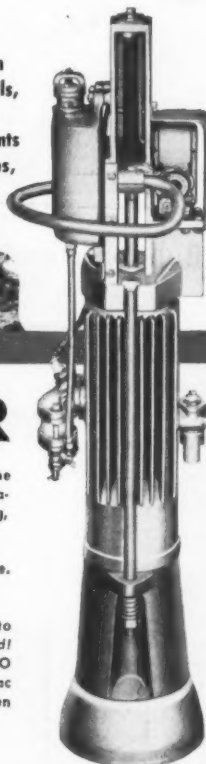
Barco Rammer in use on Benbrook Dam project near Fort Worth, Texas.

● The *thrusting* heavy impact of the Barco Rammer gives you deep, penetrating compaction. Barco's work fast, too — 50 to 60 blows per minute—with no operator fatigue. A Barco Rammer operating on lifts of 12 to 20 inches gives specified compaction at costs as low as one-fifth of other methods*. Even where specifications limit lifts to 4 to 6 inches, the Rammer gives substantial savings.

The Barco Rammer regularly turns out 160 to 180 cubic yards of compacted fill per eight-hour day. *Figure your costs and you will figure Barco! IT'S FASTER! IT'S CHEAPER!*

*Tests certified by government agencies.

for soil compaction close to walls, culverts, and abutments—in trenches, ditches



BARCO "Pegson" GASOLINE RAMMER

SIMPLE, RUGGED, PORTABLE—The improved Barco Rammer is a completely self-contained work unit. Take it anywhere; no auxiliary or extra equipment required. Gets the job done with lowest capital investment in equipment!

EASY STARTING—Not affected by cold or heat. No heavy parts to move or turn; nothing to freeze. Simple carburetor; "hot spark" magneto ignition.

LOWER OPERATING COSTS—Runs 4 to 6 hours on a gallon of gasoline and one-half pint of oil. Negligible maintenance.

ANYONE CAN OPERATE—Ask for the nearest Barco distributor to give you a demonstration. See how easy it is to operate. No lifting, straining, or skill required.

SAFE—Natural work position keeps operator safe. Operator controls each stroke. Runaway-proof.

QUICK DELIVERY—Now is the time to order while stocks are available. Be prepared! Catalog and information on request. BARCO MANUFACTURING COMPANY, 1818 D Winnemac Ave., Chicago 40, Illinois. In Canada: The Holden Co., Ltd., Montreal.

BARCO DISTRIBUTORS LOCATED IN ALL PRINCIPAL CITIES

FREE ENTERPRISE—THE CORNERSTONE OF AMERICAN PROSPERITY

New Jersey Parkway — A Modern Highway

(Continued from preceding page)

possible to obtain plant growth of any type. Here granite blocks were laid dry on a sand base, with sand in the joints. This type of treatment reduces maintenance to a minimum as well as producing an attractive finish under bridges.

Again, granite blocks laid dry, with topsoil in the joints and seeded to grass, provide and extend optically a narrow acceleration-lane separator, which is terminated by a corrugated singing concrete separator where the island is narrower than 3 feet.

All of these minor parkway design details, when given special treatment, add greatly to the overall appearance of the completed transportation facility and in many instances help reduce maintenance cost.

Plans are being prepared as rapidly as possible for the other parkway sec-

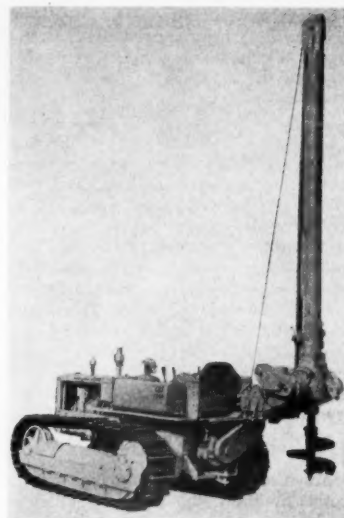
tions, and the construction work will be completed as soon as funds are made available.

A paper presented before the Committee on Roadside Development of the American Association of State Highway Officials, December 6, 1950, Miami, Fla.

Maintenance Coating

A circular on Gaco Neoprene maintenance coating, an air-curing liquid designed for protective coatings on steel, wood, and cement, is available from Gates Engineering Co., P. O. Box 1711, Wilmington, Del. This product, the literature says, is temperature and abrasion-resistant, and may be easily applied without special equipment. Application instructions and a table of coverage requirements are included. The circular points out that this corrosion-protective coating is available in a variety of colors or as a transparent material.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 581.



A Caterpillar D4 with a Trackson Model EA4 earth auger is now available for earth boring or pole setting.

Auger-Tractor Unit

The Trackson Model EA4 earth auger is now available with the Caterpillar D4 60-inch-gage tractor as an earth-boring and pole-setting unit.

The Model EA4 will drill holes 9 to 24 inches in diameter—to a depth of 8 feet with the standard 13-foot bar or to a depth of 11 feet with the optional 16-foot bar. The auger bar is square to permit full bearing contact through the driving head. It has a 5,000-pound capacity which handles poles up to 50 feet in length.

The auger unit is compactly mounted on the Caterpillar D4 tractor for run-

ning over rough ground or working in close quarters. The tractor has a 5-roller nonoscillating track frame, large front idlers, and 16-inch grouser tracks to provide stability and balance in all types of terrain. This unit may be used for drilling holes for poles, anchor holes, or tower footings, and for setting power-line poles. Protective heavy-duty track roller guards are offered for operation under adverse conditions.

Further information may be secured from Caterpillar Tractor Co., Peoria 8, Ill. Or use the Request Card at page 16. Circle No. 587.

Soil-Testing Equipment

A series of circulars forming a catalog on soil-testing equipment is now offered by Soil Testing Services, Inc., 4520 W. North Ave., Chicago 39, Ill. The diversified line includes unconfined-compression devices, consolidation apparatus, triaxial-shear apparatus, soil-mixing machines, compaction equipment, preparation equipment, trimming tools, power hacksaws, permeameters, classification apparatus, calibrated weights, sieves, and miscellaneous equipment. A variety of models is offered for each type of equipment. These are illustrated and described.

This literature may be obtained from the company, or by using the Request Card bound in at page 16. Circle No. 592.

Howard at Goodyear

Charles W. Howard, Lakewood, Ohio, has joined the rim-sales staff of The Goodyear Tire & Rubber Co. as a field contact man. He was formerly with International Harvester.



BAKER Blades

Bulldozer and Gradebuilder

Positive hydraulic action—that's the secret of the smooth performance that we build into every Baker Bulldozer and Gradebuilder. Positive down-pressure and direct lift are the twin features of this hydraulic action. Twin engine-mounted hydraulic cylinders (Baker was first,

again, with engine-mounting) do the job in these new BAKER attachments for your ALLIS-CHALMERS Tractor. Write for Bulletin 894.

...and if you want to pull 'em out by the roots... BAKER ROOT RIPPER



P.S.: Baker is the PIONEER and the SPECIALIST in bulldozers

FIRST AID

For New Hospital

WITH McKIERNAN-TERRY

PILE HAMMER

A new hospital being erected in front of the old one in Mobile, Alabama. For quick pile driving, the Ewin Engineering Corp., contractors, used a McKiernan-Terry Pile Hammer.

Before excavation could be started for the new boiler room, a row of steel sheet piling first had to be driven for 130 feet around the sides of the present hospital, and but one foot away from a wing of the existing building. A McKiernan-Terry 9-B-3 was used to do the work speedily and accurately. Later, these piles were pulled out with a McKiernan-Terry E-4 Double-Acting Pile Extractor. 15 sizes of single-acting and double-acting hammers and the 2 sizes of double-acting extractors are available in the complete McKiernan-Terry line. Write for bulletin.

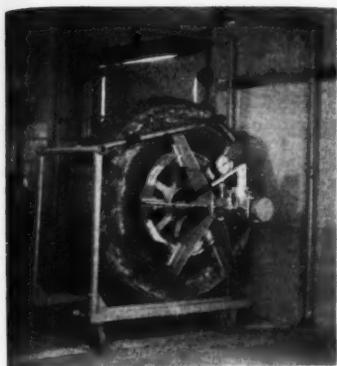
McKIERNAN-TERRY CORPORATION
Manufacturing Engineers
19 PARK ROW, NEW YORK 7, N. Y.
Plants: Harrison, N. J. and Dover, N. J.

McKIERNAN-TERRY



MC-287

HONING TO 42" I. D.



Here is the Tirematic tire changer with gage and dolly.

A New Tire Changer For Heavy Equipment

A new tire changer for use on heavy-duty construction equipment has been engineered by Dixie Tallyho, Inc., Fairburn, Ga. The Tirematic comes in manual and hydraulic models for use either in the field or in the shop. It removes tires from rims in several minutes with no damage to either tire or rim, the company says.

The company reports that 12 to 18-ton pressure can be exerted by slight movement of the hand-operated pump on the hydraulic model. A fitted gage indicates the exact amount of pressure used in removing the tire.

Also shown in the accompanying photograph is the Tirematic dolly, designed for handling large wheels such as those used on heavy earth-moving machines.

Further information on this equipment may be secured from the company. Or use the Request Card at page 16. Circle No. 611.

Officers for Constructors

National Constructors Association, a group of engineers and builders of chemical plants, steel mills, and petroleum refineries, has elected J. F. Pritchard President. Mr. Pritchard is head of J. F. Pritchard & Co. of Kansas City, Mo.

J. J. O'Donnell, who manages personnel and labor relations for the Lummus Co., New York, was chosen Vice President of the association, and C. B. Bronson was re-elected Secretary-Treasurer.

New members of the Executive Committee are E. D. Hoekstra of The H. K. Ferguson Co., Cleveland; W. Earl Dunn of the Fluor Co., Los Angeles; and J. M. Kelley, of Rust Engineering Co., Pittsburgh.

C. D. Haxby, also of Rust Engineering, heads the Labor Committee. W. Q. Ashley of Foster-Wheeler Co., New York, heads the Foreign Committee. And F. R. Griffin of Koppers Co., Pittsburgh, is Chairman of the Safety Committee.

Bil-Jax Adds to Plant

By the end of last year, Bil-Jax, Inc., had completed a large addition to its plant in Archbold, Ohio, where it makes tower-type scaffolding, rolling work platforms, maintenance trestles, sec-

tional and lean-to ladders of tubular steel, ladder jacks, leveling jacks, scaffold brackets, hoist arms, etc.

The firm has also introduced a house organ called "Bil-Jax Scaffolding News". Contractors who want to receive issues should address requests directly to the company at Archbold.

Literature on Engines

Three new mailing pieces on gas, gasoline, and diesel power sources have been announced by the Industrial Power Division of International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill. These units include 5 carbureted-type models, operating on gas, gasoline, or distillate, which have a horsepower range from 16 to 55. The six diesel models have a net maximum horsepower range from 45 to 180. The literature outlines the features of these power units and illustrates their use.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 590.



A test run with the first of several bituminous spreaders being built by the Road Machinery Division of Standard Steel Corp. on a Government contract for Armed Forces use. The spreader is designed to handle many types of bituminous substances from road oil to heavier asphalts, and will be employed for road construction and air-strip work in areas where a completely self-contained mobile unit is required.

There's **EXTRA** PRODUCTION at 8 points in these four plants

8 A-W JAW CRUSHERS of various sizes

each with the

SPEED

LONG JAWS

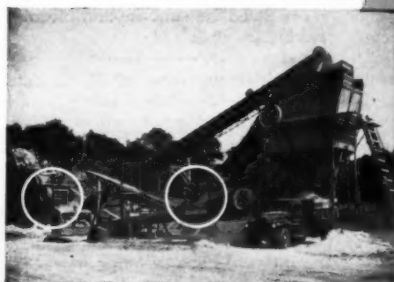
LONG STROKE



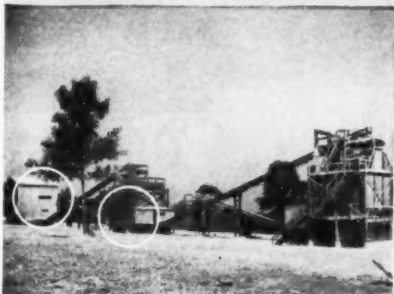
which puts an **EXTRA** amount of rock through a jaw crusher

Continuous operation and minimum maintenance expense are assured by the skilled engineering and sound manufacturing that characterizes every Austin-Western Crushing and Screening Plant. Each plant is designed to solve a particular production problem. We would welcome the opportunity to discuss yours.

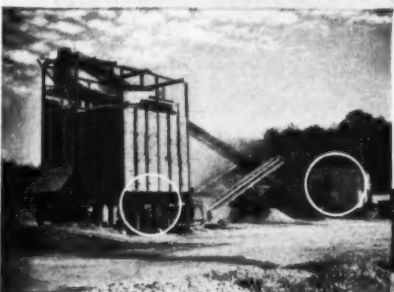
AUSTIN-WESTERN COMPANY, AURORA, ILLINOIS, U. S. A.



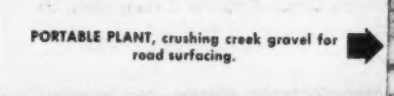
SEMI-PORTABLE PLANT, producing agricultural limestone and road rock.



STATIONARY PLANT, producing agricultural limestone and several sizes of crushed rock.



STATIONARY PLANT, producing concrete aggregate, road rock and agricultural limestone.



PORTABLE PLANT, crushing creek gravel for road surfacing.



Use the ...

PORTABLE SHELDON PUMP

"You See When Tank Is Full"

- ★ Pumps 15 gallons per minute
- ★ Primes itself
- ★ Lifts Gasoline 15 feet
- ★ LONG LIFE (No Lanterns)
- ★ Strains Fuel through Replaceable Strainer

CUSENBARY SALES CO.

CUNNINGHAM KANSAS

BUILDERS OF ROAD MACHINERY

Austin Western

SINCE 1880

Select Material Strengthens Base

Low CBR Value of Soil Is Improved by Hauling Good Sand From Borrow Pits

• THE major relocation of U. S. 85 and 85A between Newcastle and Torrington, Wyo., has often been a problem because of unsatisfactory soil conditions. Midway between Lusk and Newcastle, a new 10.154-mile cutoff leading toward Edgemont, S. Dak., and the Black Hills, certainly illustrated the problem.

H. F. Emme Construction Co. of Rapid City had the \$168,140 Wyoming Highway Department contract for grading, drainage, and selected embank-



C. & E. M. Photo

An Atlas conveyor loads select embankment material for the relocation of U. S. 85 and 85A between Lusk and Newcastle in Wyoming.

ment material. The 353,000-yard excavating and grading job posed no problems, but Emme had to open up 6 special borrow pits to get the 88,000 yards of selected material.

CBR tests indicated that 4 of the pits would give material slightly above a value of 15, one would go 25 plus, and one went slightly higher than 50.

Two Caterpillar D8's with one Caterpillar 80 scraper and one Wooldridge 12-yard Terra Clipper scraper, moved the pit-run material over to a point close to a feeder trap. A D8-mounted bulldozer then shoved the sand and gravel into the gravity-feed trap, which trained the material onto an Atlas mobile conveyor unit. A fleet of from 8 to 10 dump trucks hauled the material out and spread it to give a compacted depth of from 10 to 14 inches.

Processing consisted of a light road-mixing by blades, watering, and pneumatic rolling.

Light Compaction on Grade

One of the features of the grading was the lack of excessive sheepfoot-roller work. Only 530 sheepfoot hours were set up for 353,000 yards. The dirt was brought into the fills by 3 D8-drawn Caterpillar 80 scrapers, and 3 Wooldridge Terra Cobras. As the machines brought the earth in, they moved around all over the fill to distribute the heavy tire tracks around as much as possible. Light lifts, under 4 inches, were laid, and the equipment compaction worked wonderfully.

The finished subgrade, topped out with the select material, is 32 feet wide, and crowned about 4 inches. Later on, additional contracts will be let to place the subbase and bituminous paving.

Regular purchase of U. S. Savings Bonds means personal security as well as a share in the national security

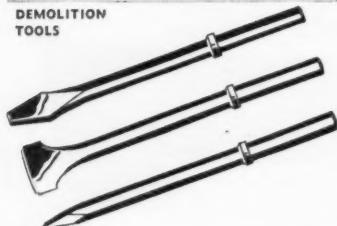
The Nation's Wood Supply

During these critical times, many of us in the construction industry are concerned about the stockpile of raw materials in the nation. With timber a prime construction material, we may wonder if the forests of the United States, after 300 years of production, are capable of meeting unprecedented military and civilian needs. The answers to this and other questions are found in a new 24-page booklet, available from American Forest Products Industries, Inc., 1319 Eighteenth St., N. W., Washington 6, D. C. It explains what is being done—and what has been done—to insure an adequate wood supply for today and tomorrow. "The Nation's Wood Supply" is a factual appraisal of the forests—a concise, pictorial presentation of statistics made available by industry, and by Federal, state, and private agencies.

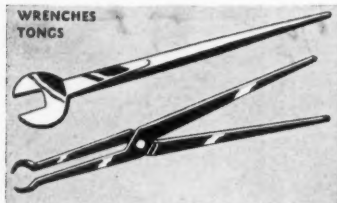
This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 596.

STRUCTO LINE OF CONTRACTORS TOOLS

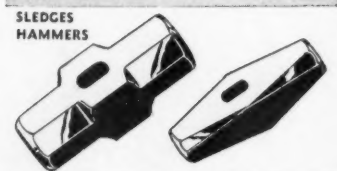
DEMOLITION TOOLS



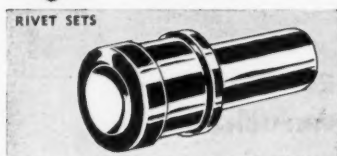
WRENCHES TONGS



SLEDGES HAMMERS



RIVET SETS



DRIFT PINS



AIR HAMMER TOOLS



ALL STRUCTO tools are made in the Arrow shops by skilled tool makers.

Only the finest quality steel is used, and every STRUCTO tool is backed by 36 years experience in making fine tools.

Write for Bulletin No. 75 showing the complete line.

ARROW TOOLS INC.

1900 South Kostner Ave., Chicago 23, Ill.

FULCO COTTON CONCRETE CURING MATS



ON THE JOB

At the Huge
Alaskan Way
Viaduct
in Seattle,
Washington

Shown in the photographs above is a portion of the giant Alaskan Way Viaduct under construction by McRae Bros., Contractors, of Seattle, Washington. This million dollar project is one of many using the curing efficiency of Fulco Cotton Concrete Curing Mats. Fulco mats, sturdily designed of tough cotton fabric with stitched edges and seams, insulate against sudden temperature changes, stay wetter longer, and increase the flexural strength of the concrete—and they may be used over and over again, making the cost per job almost negligible. Use Fulco Cotton Concrete Curing Mats for best curing results on your concrete jobs. See your equipment dealer or wire direct for prices.

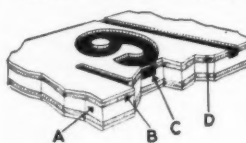
Fulton also manufactures sturdy, top quality Triple Strength Tarps, drop cloths, and tents. Indispensable protection at economical prices.

Fulton BAG & COTTON MILLS

Atlanta • St. Louis • Dallas • Denver • Kansas City, Kans. • Minneapolis
New Orleans • Los Angeles • New York, 347 Madison Ave. • Winter Haven, Fla.

ROE STEEL TAPES give you MORE for your money!

HANDIER! Longer lived! Better looking! . . . You get everything with Roe Steel Tapes! They're extremely easy to read . . . and stay legible. Black markings are etched into the steel which is then nickelplated to give a lustrous background. An added transparent plastic coating assures maximum durability.



A—Steel tape
B—White nickel
C—Black etched markings
D—Plastic overcoat

Shown here is Roe Steel Tape #202A with leatherette metal-band case. Other models feature cases in handsewn leather, and in metal-banded leather. All have a reinforced rust resistant liner, flush-folding handle, press button center and roller mouthpiece. Available with 25, 50, 75 or 100-foot tapes; feet in inches and eighths, or in tenths and hundredths . . . also, with unique retractable hook for long one-man measurements.

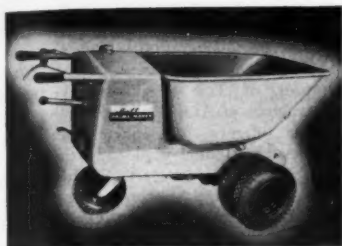
Get Roe Steel Tapes from your hardware dealer—or—send us his name and address.



JUSTUS ROE & SONS

Makers of fine steel tapes since 1876

PATCHOGUE, NEW YORK



Capacity has been increased to 1,500 pounds, bucket or platform loads in the new Bell Model 15 Prime-Mover.

Power Wheelbarrow

A new and improved Model 15 power wheelbarrow has been announced by Prime-Mover Co., Third and Oaks Sts., Muscatine, Iowa. New features include direct drive with half-speed reverse under power; 5-hp Wisconsin engine; constant-mesh transmission; and conveniently placed operator's controls.

Two sizes of platforms, with stakes, are interchangeable with the bucket. Capacity has been increased to 1,500 pounds, bucket or platform load. The unit has a turning radius of 33 inches and is 31½ inches wide to permit travel through doorways.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 554.

New Rust Inhibitor

Three new specially chromated anti-rust paints have been added to the Rustrem (Rust Remedy) line of maintenance coatings, announces Speco, Inc., 7308 Associate Ave., Cleveland 9, Ohio. They come in clear, black, and aluminum, and possess the penetrating and sealing qualities of standard Rustrem. In addition they contain liberal quantities of chromate pigment which, according to the manufacturer, is in itself an efficient rust inhibitor.

Rustrem Chromate Special stands up under extreme conditions of temperature and moisture. Like standard Rustrem, it can be applied right over rust without wire brushing or scraping. No primer is required. It is suitable for both interior and exterior use. Rustrem Chromate Special is available in quart, gallon, and 5-gallon cans, and in 55-gallon drums.

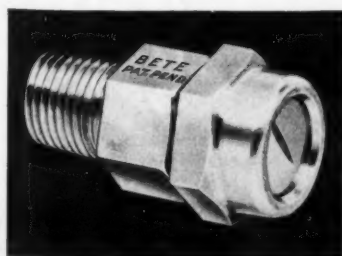
Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 625.

Line of Fan Nozzles

A new and improved line of flat-spray or fan nozzles designed to give uniform coverage has been announced by Bete Fog Nozzle, Inc., 85 Pierce St., Greenfield, Mass.

Side jets or horns containing coarse droplets have been eliminated, and the spray pattern has been made heavier in the center than at the edges of the fan. According to the manufacturer, there is less overspraying due to doubling up of the sprays from adjacent nozzles.

The Bete F Series nozzles include 13 disks made of stainless steel with flow rates of 0.1 to 10 gpm and spray angles of 50 to 90 degrees. All disks are interchangeable in a brass base and cap as-



The Bete F Series nozzles are reported to include 13 disks with flow rates of 0.1 to 10 gpm.

sembly having a ¼-inch male-pipe connection. Built-in removable strainers are available for the smaller nozzles.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 586.

Portable-Grinder Catalog

A catalog outlining the entire line of Cleco portable pneumatic grinders has been prepared by the Cleco Division of Reed Roller Bit Co., P. O. Box 2119, Houston, Texas. It illustrates and describes grinders with a wide range of application, and speeds from 2,000 to 20,000 rpm. In addition to complete data on rotary grinders, it gives information on a special series of cone grinders, vertical grinders, and wire-brush machines. There are tables of specifications for all models, and a large engineering drawing shows a cross section of one of the units.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 699.

Heavy-Duty Rear-Dumps

The Models 80FD and 82FD rear-dump Euclids, of 15-ton or 9.7-cubic-yard capacity, are described in a new 8-page catalog released by The Euclid Road Machinery Co., Cleveland 17, Ohio. The bulletin describes the various features of the off-highway hauling units designed and built for moving earth, rock, ore, and other

heavy excavation. Powered by Cummins 165-hp or General Motors 190-hp diesel engines, these units, with 30,000-pound payload, have a top speed of 21.5 or 26.4 mph. Plenty of on-the-job photos, lists of all features, and full specifications are provided.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 624.

"BERG" Concrete Surfer



A light-weight, portable, electric motor-driven Concrete Surfer consisting of the Model R-2 Right Angle Head and Model AS Motor Unit.

Ideal for surfacing concrete construction and other applications.

Quickly converted into the Model V2-AS Concrete Vibrator for Internal vibration by substituting the Model V2 Vibrator Unit for the above Head.

The Concrete Surfacing Machinery Co.
4665-4669 Spring Grove Avenue, Cincinnati 32, Ohio

B.F. Goodrich



Working on the levee with 33-ton loads —this job calls for Super Traction!

WORKING on a levee enlargement job, the bottom-dump Euclid shown above is being loaded with over fifteen cubic yards of fill dirt from a borrow pit. Add an equipment weight of 35,700 pounds and this king-sized load represents a real traction job. When you consider that the thirty-three tons must be worked over soft, sandy loam—you have a job for super traction!

That's where the B.F. Goodrich Super Traction tire takes over. Notice the wide, deep footprint left by these tires—especially designed for jobs where real pulling power is needed in sand, loam, mud and soft dirt. The deep cleats take a big bite, yet this

tire is built wide to "float" as it rolls. Designed for drive wheels, it serves equally well on free-rolling wheels in reversed position. That's the success story of the BFG Super Traction.

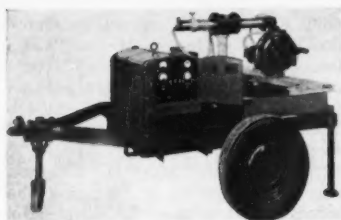
In addition to a longer-wearing tread compound, all B.F. Goodrich off-the-road tires offer you the exclusive protection of a nylon shock shield (double in the larger sizes). Layers of nylon cord are built into the tire between the tread and the rayon cord body. This shields the backbone of the tire against shocks and costly bruise breaks.

Such patented protection as the nylon shock shield is yours at no extra cost when the B.F. Goodrich brand is on

your off-the-road equipment. There's a specially-designed, deep tread for every job.

See your B.F. Goodrich Dealer. Specify BFG tires for your new equipment. Enjoy the longer service and lower operating overhead offered you by The B.F. Goodrich Company, Akron, Ohio.





Consolidated Machinery & Supply Co. makes this trailer-mounted combination radial power saw and generator.

A Trailer-Mounted Power-Saw-Generator

A new trailer-mounted combination radial power saw and generator has been announced by Consolidated Machinery & Supply Co., 2031 Santa Fe Ave., Los Angeles 21, Calif. The saw is a 3-hp 3-phase 240-volt Comet Clipper that cuts stock 16 inches wide up to 4 3/8 inches thick. A 4-cylinder gasoline engine drives the generator which delivers 5 kw of power. This provides power for the saw and for 6 single-phase 120-volt power outlets for portable electric tools. Saw, generator, and motor are all mounted on an all-steel two-wheel trailer.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 584.

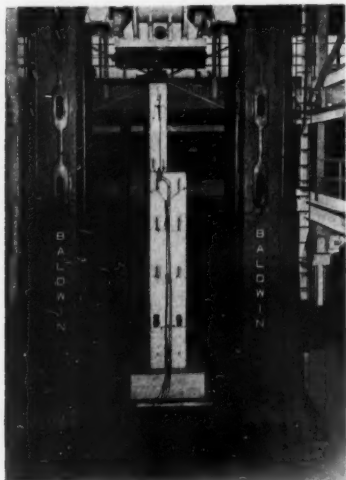
Concrete Column Tested

The largest and the smallest test-loading and load-measuring equipment known, according to Baldwin-Lima-Hamilton Corp., are being used together by the U. S. Bureau of Reclamation in the Bureau laboratories at Denver, Colo. Their function in a recent test was to determine the load-carrying capacity of a reinforced-concrete step-column 22 feet high, its weakest point under load, and stresses and strains on the surface and within the column.

The load was applied to the pilaster; no load was applied to the step. Failure occurred immediately above the step under a load of 1,675,000 pounds. The longitudinal reinforcing steel buckled, accompanied by sheer and compression failure of the concrete.

During the application of the increasing load, Baldwin SR-4 resistance-wire strain gages, bonded to the concrete surface of the column and internally on reinforcing bars, measured the strains occurring at many points on the column by the change of electrical resistance in the wire grid. By means of a nearby Wheatstone bridge and amplifier circuit these changes were translated into inches of deformation per inch of length.

The test is typical of many to be undertaken by the Bureau on concrete structures, both full size and models. The column was designed for use in Bureau power plants.



Baldwin-Lima-Hamilton testing equipment determines the load-carrying capacity of a 22-foot concrete step-column in Bureau of Reclamation laboratories at Denver, Colo.

Road Building Must Not Stop During Emergency

Though American industry is far better prepared to meet the challenge of a possible conflict than it was before World War II, "our highway plant is slightly better than one-third as well prepared to shoulder arms". This was a reminder by Allen Wagner, Public Relations Director of the American Road Builders' Association, at the annual convention of the Truck-Trailer Manufacturers' Association.

Even before Korea, he said, our highway program had not kept pace with our industrial expansion. "With our

expanded output, the emergency will place an additional strain on our traffic arteries, which we neglected in World War II." He urged, "If we are to live up to our belief that 'we did it before and we can do it again', we must continue to build roads in the long-pull industrial expansion program on which we are now embarking."

"To fail to build up our roads while we increase our production," he said, "would be to invite disaster in the form of an economic breakdown of precisely the kind our enemies would delight to see . . . Even more than it depends on our troops, the world today counts on an economically strong America."

Detroit AGC Elects Officers

At its annual banquet last January in the Detroit Athletic Club, the Detroit Chapter of The Associated General Contractors of America elected the following officers for 1951: President, Charles H. Richert of J. A. Utley Co.; First Vice President, A. S. James of O. W. Burke Co.; Second Vice President, John Cooley of John Cooley Co.; and Treasurer, G. K. Chapman of Walbridge, Aldinger Co.

AGC President Walter L. Couse, Past President Dan W. Kimball, and Managing Director H. E. Foreman spoke at the banquet.

ALLIS-CHALMERS Sets New Standards

... THE NEWEST, FINEST

model **HD-20**
Hydraulic Torque Converter Drive
175 net engine hp.
41,800 lb.

model **H15**
102 net hp.
27,000 lb.



Get the full story from your Allis-Chalmers dealer.
See these tractors perform. They're built for **YOOB!**

Corps Recruiting Civilians For Overseas Appointments

The Portland, Oregon, District of the Corps of Engineers is recruiting civilian employees for work with the Corps in overseas areas. Vacancies exist in Okinawa, Japan, Guam, Austria, Germany, France, Trieste and Turkey. In general, the positions cover engineers, engineering aides, draftsmen, inspectors, construction superintendents, equipment and diesel-power mechanics, property and supply, repair and utility foremen. Qualifications are the same as for positions in the United States. In the age group 18 through 26,

only veterans will be considered and they will be required to obtain a release from their draft boards.

Interested qualified persons should apply in person or by mail to the Office of Chief of Engineers, Civilian Personnel Division, Building T-7, Washington 25, D. C.

Mobile-Crane Catalog

A new 24-page catalog on the Crane-Mobile has been offered by Bay City Shovels, Inc., Bay City, Mich. All design, construction, and application features of the unit are explained and illustrated with some 74 photographs.

The Crane-Mobile is available in 4 sizes with a choice of 7 mountings. Crane capacities range from 10 to 25 tons. The catalog provides the inside picture of the machine assembly and gives details on the gantry, pin-connected boom, and jib. Also illustrated is the specially designed Crane-Mobile carrier which is available in five models—6 x 4 and 6 x 6 drive with 8 and 9-foot overall widths. The balance of the booklet shows the Crane-Mobile on large and small jobs, routine and specialized.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 698.

Water-Resistant Admix

A brochure describing Anti-Hydro, a water-resistant compound for use in concrete and mortars, has been prepared by Anti-Hydro Waterproofing Co., 265-277 Badger Ave., Newark 8, N. J. It contains directions for application, and explains that Anti-Hydro will produce impermeability, hardness, and internal curing. A chart shows how Anti-Hydro is used in various mixes.

The compound is sold in 1, 5, 20, and 30-gallon containers.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 597.

**for Tractor Performance
for Lasting Durability
for Simplified Servicing
for Ease of Operation**

TRACTOR LINE ON EARTH

model **HD-9**
70 drawbar hp.
18,500 lb.

model **HD-5**
40.26 drawbar hp.
11,250 lb.



Originator of the Torque Converter Tractor

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

State Headquarters Built in Portland

Seismic Joint Is Interesting Feature of Construction as Contractor Speeds New State Office Building

• THE sprawling, disjointed functions of Oregon's state government in Portland will soon be consolidated under one roof. In a complete block at S. W. 4th and Clay Streets, Ralph & Horwitz of Portland is pushing the erection of a big new 11-floor office building. With

land and engineering, the architectural-concrete structure is expected to cost approximately \$2,500,000.

Construction of the building is interesting chiefly because of earthquake joints which make the U-shaped structure essentially three buildings. There



C. & E. M. Photo

Almost all concrete for the Oregon State Building was mixed by a Mixermobile.

is a 1-inch seismic joint separating the single-story front of the building from the main body and wings. The wings are separated from the back building by a formed 2-inch joint. Sliding brass panels will hide the 2-inch joint where it is exposed to outside view.

Building Is Ultramodern

Designed by Dougan, Heims & Caine of Portland, the new State Building is modern in every respect. Built of reinforced architectural concrete, the first floor is roughly 200 x 200 feet. The remaining 10 stories, of similar construction, are U-shaped, with 43-foot wings extending 115 feet on either side from the back line of the structure. A heavy parking deck over the open portion of the first floor will accommodate 78 automobiles.

The building exterior is granite and

terra-cotta, with aluminum windows and sash. On all but the top floor, asphalt and rubber tile blocks will be used. The top floor, which will be occupied by the Oregon Board of Health offices, will have oxychloride cement terrazzo.

Construction Not Easy

Measured by any standard, construction was no easy task. To get down to footing grade, Ralph & Horwitz had to dig a monstrous hole 40 feet deep in tricky sand. That required extensive and heavy steel bracing to protect the streets and sidewalks nearby from caving in. One footing pour alone, carrying the four service elevators in the center of the building, had 1,200 cubic yards of concrete. It was necessary to buy and use almost 500,000 board-feet

(Concluded on next page)

WHAT has this Diesel got...?

...PLENTY! BULLETIN 1569 WILL TELL YOU

WAUKESHA

6-NKDU Diesel

MOGUL SIX POWER UNIT

BULLETIN 1569

WAUKESHA MOTOR COMPANY • WAUKESHA, WIS.

Eastern Sales Office: Eight W. 40th St., New York 18, N. Y.
Mid-Continent Office: 703 S. Whiting St., Tulsa, A. Okla.
Pacific Coast Office: 4937 Pacific Blvd., Los Angeles 38, Calif.

• High continuous net output—201 hp continuously at 1500 rpm—that's with all standard power unit accessories. And momentary overload is 272 hp at 1200 rpm. Waukesha's new Mogul Six is a full Diesel, four-cycle, solid injection. Six cylinders, 7-in. bore, 8 1/4-in. stroke, 1905 cu. in. displacement. Its unique patented combustion chamber cannot be had in any other American Diesel engine! That means smooth, clean, shock-free operation with high fuel economy. You can change over to natural gas, or vice versa, right in the field (there's a quick conversion kit for this). This Diesel unit has all "top drawer" mechanical features—lots of 'em—all interesting. New Bulletin 1569 tells you. Send for one.

113

**WAUKESHA
MOTOR COMPANY
WAUKESHA, WISCONSIN**
NEW YORK TULSA LOS ANGELES

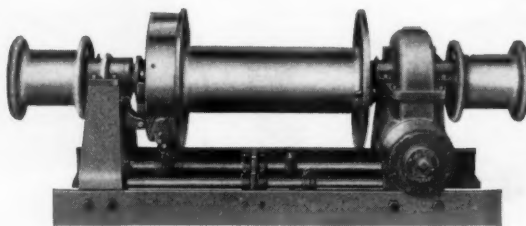
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To get the most work from your tractor or truck, install a Tulsa Winch. Available in 28 different models in capacities from 6,000 to 80,000 pounds, there is a Tulsa Winch for every construction job. Get in touch with your nearest Tulsa Winch distributor now or write direct to

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Tulsa Winch
DIVISION OF
TULSA, OKLAHOMA VICKERS INC.

815-35 E. First Street

of lumber for the forms. A substitute had to be devised for the 1-inch seismic joint, and special stripping tools had to be made so lumber could be freed from the 2½-inch opening.

Excavation was handled by Oscar Butler & Son, and the job involved the movement of about 50,000 cubic yards of material. It was a shovel-truck job, with some work done by clamshells and backdiggers. Two Byers machines with a fleet of 9 dump trucks moved the sand in 10-foot lifts, ramping down until project grade was reached. The excavated muck was hauled to a small revetment project along the Willamette River, and dumped as a backing for riprap.

Extremely heavy 10-inch steel H-beam bracing held the banks in position until the footings and the lower portion of the building were built. One hard squeeze by the crawling ground threw 5 inches of deflection in the shoring, and sent the contractor scurrying around to get additional bracing installed.

**Avoid costly errors
with this . . .**

**NEW UNIVERSAL
Level Transit**



Price \$185.00
complete with tripod



Now David White offers you, at the lowest price anywhere, the finest of Universal Level Transits with 4½" protected arc, internal focusing and coated optics.

Don't wait if you're in the market for a new all-round practical builder's instrument — see the improved new David White Model 3000 Universal Level Transit now.

You'll find this instrument properly used will be your best insurance against costly layout and building errors. The new 4½" protected arc means easier, more accurate readings, less likelihood of instrument damage through accident. Internal focusing assures you of dust and dirt-free inside lens surfaces, better protection for optical parts and mechanism. Coated optics mean clearer, distortion-free images, sharper definition, positive readings at greater distances and under adverse conditions. Instrument spindle supported on ball bearings for perfect horizontal adjustments.

Ask your nearest dealer to give you complete information on this and other fine engineering instruments. Or write direct to David White Co., 313 W. Court St., Milwaukee, Wis.

We offer complete, prompt repair service on all makes of instruments — levels, transits, theodolites, etc.



Prices subject to

Wood Forms Throughout

Two complete sets of wood form panels, 18 feet long and 11 feet high, were used over and over as the building rose. These panels consisted of shiplap facing with a plywood recessed strip (for additional holding power for the granite exterior) nailed to 2 x 4 studs at 16-inch centers. Inside framing drifted up on an elevator, while the heavy outside panels were hoisted by two 1½-ton Beebe hand crabs. An entire set of forms was raised in 16 hours, and the speed was sufficiently great to average one complete 14,000-square-foot floor in 8 days.

Superior form clamps were used on columns and pilasters. Flooring pours were set on 4 x 4 timber shores which fitted each floor. The metal pans and joist panels for the floors were all numbered with their exact location, a practice which paid off in efficiency and speed as carpenters dismantled them and moved them ahead.

The carpenter gang included an average of 2 foremen, 44 carpenters, 24 laborers, and a labor foreman.

Mixermobile Mixes Concrete

All concrete was mixed on the job by a Mixermobile, with the exception of a very small amount of truck-mixed material. Dry aggregates and cement were furnished by Nickum & Kelly in 4-yard batches. For the concrete below ground, Anti-Hydro moisture repellent was used in the mix, and Pozzolite was also used for all the concrete. In some cases the Mixermobile tower hoisted concrete 165 feet high.

As the Mixermobile delivered the concrete to the deck hopper, five concrete buggies carted the material to the pour. Internal vibration was used, along with rodding and hand consolidation.

Stripping of the form panels from the seismic joint was somewhat of a problem. The panels had been erected with sliding wedges as spreaders, but moisture swelled the wood and it was necessary to build special wrecking bars about 36 inches long to remove the wedges. Once they were loosened, the forms dropped out. It was impractical to form the 1-inch seismic joint, however, and this space was filled with Fir-Tex, which will "give" in case of an earthquake.

Concrete work was expected to be completed by Christmas of 1950, but it will take until September, 1951, to finish the exterior facing and interior trim. The building is scheduled for occupation by the end of this year.

In spite of construction problems and a dangerous potential caving situation along the sides of the foundation, Ralph & Horwitz brought the building up without a single hitch, and added another architectural masterpiece to Portland's skyline.

Personnel

Ralph Shook, General Superintendent, directed field work for Ralph & Horwitz, and coordinated the work of



C. & E. M. Photo

In some cases the Mixermobile tower hoisted concrete for the new Oregon State Office Building as much as 165 feet. Five buggies carted the concrete to the pour.

the materials suppliers and subcontractors. R. A. Case was the State Inspector for the Oregon Board of Control, for whom the work was done.

The careful selection and use of good lubricants at regular intervals will keep your equipment operating efficiently and economically.

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"Spray Master"

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THE MASTER OF ROAD BUILDING

When it comes to spraying bituminous materials on roads, streets, highways or runways, there's no unit that can operate at a lower cost than the Littleford "Spray Master" Pressure Distributor. This unit with either a Standard or a Full Vacuum Flow Circulating Bar up to 24 feet in width can lay material on the highway with 100% efficiency.

Then too, there are no gadgets to take a lot of the operator's time turning them off and on; with a "Spray Master" one valve starts and stops the spray.

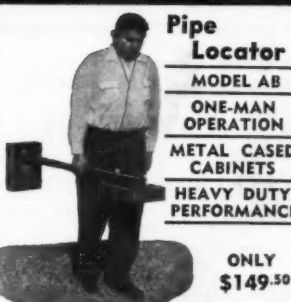
"Spray Masters" are made in models up to 4000 gallons in size. Make your next Distributor the master of them all, the "Spray Master."



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Use of Steel Sheet piling To Control Soil or Water

How to use lightweight corrugated-steel sheet piling to control the movement of soil or water is described in a new 10-page illustrated booklet prepared by Armco Drainage & Metal Products, Inc., Middletown, Ohio. Entitled "Armco Steel Sheet piling for Trenches, Cofferdams, Cutoff Walls, Shore Protection", it points out where Armco interlocking and flange-type sheet piling can be used. It explains that the interlocking type is used primarily where watertightness

is required, and the flange-type sheet piling is used for trenches and wherever else ordinary wooden planks would be used.

Features cited for corrugated-steel sheet piling are its light weight, its high strength, and its re-use and salvage value. The booklet describes driving methods and properties of both types of sheet piling. It gives additional data on the method of figuring sizes and spaces of wales and struts.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 582.



The Pixtone is designed to pick up stones from 1½ to 10 inches, and to lift and carry up to 1½ tons.

Stone-Picking Unit

A new trailer-type unit for picking stones from 1½ to 10 inches in size has been developed by Bridgeport Implement Works, 1483 Stratford Ave., Stratford, Conn. The Pixtone may be towed behind any tractor and the picking mechanism is fitted with a separate 3 to 6-hp air-cooled engine. The unit may be used in roadside-development work prior to seeding operations, for clearing shoulders of gravel and stones, and for surface raking of secondary roads. It will lift and carry up to 1½ tons of stones. These are dumped automatically by tripping a lever.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 697.

Lightweight Aggregate

A 6-page general brochure on Permalite lightweight plaster aggregate is now available from Great Lakes Carbon Corp., Building Products Division. One of the features of this brochure is

a short-form specification for use by architects in specifying Permalite lightweight plaster for general base-coat (scratch and brown) plaster applications. Also included are recommended mixes and applications based on American Standards Association Specification A42.1. A concise chart lists the materials required (gypsum and Permalite) for various plaster bases: gypsum lath, metal lath, and masonry.

Properties of Permalite plaster, such as compressive and tensile strength, thermal conductivity, density, etc., are stressed. The brochure points out that one of the major uses of Permalite plaster is for fireproofing structural steel, where it accounts for reductions in dead weight, particularly in essential structural steel. Typical jobs using Permalite insulating plaster are illustrated. Another section is devoted to the question "What is Permalite?"

This brochure is available on request from the Great Lakes Carbon Corp., Building Products Division, 18 E. 48th St., New York 17, N. Y., or by using the Request Card at page 16. Circle No. 620.

Story of American Roads

If roads have lost their romance and color for you and have come to mean only hard work and headaches, you may be interested in a new book called "The Story of American Roads" by Val Hart. "Where do roads start and where do they end?" the author's small daughter asked her one day, and this book, prepared with the help of the ARBA, the BPR, and others, is an answer—for young people, for laymen, or for the weary road builder who wants refreshing.

The buffalo and Indian trails pre-empted by the colonists, Los Caminos Reales of the Spanish in the south and southwest, the portage trails of French trappers, the pack-horse trails developed by the "borderers", the southern planters' "rolling" roads down which tobacco hogsheads were trundled to the wharves—those begin the story. Then Miss Hart takes up the famous name-roads: New England's Boston Post Road, Boone's Wilderness Road, the Philadelphia and Lancaster Turnpike, the Natchez Trace, and the National Road built by the Government. She tells how canals and the iron horse brought on a temporary dark age for roads, then she traces the rebirth in the westward migration via the Santa Fe Trail, the Oregon Trail, the Mormon Trail—and finally the road-building boom from 1921 to 1941 when America took to wheels. Her final section tells the exciting story of the Alaska and the Pan American Highways, and looks to the road ahead when 50,000,000 autos and trucks may be expected on our "modern" highways.

"If there is any kind of advancement going on, if new ideas are abroad and new hopes rising, then you will see it by the roads that are building. Nothing makes an inroad without making a road." This statement by Horace Bushnell is one of the many interesting sayings and poems about roads with which Miss Hart starts each chapter of her book. Equally interesting are the fine illustrations, courtesy of the BPR.

William Sloane Associates, Inc., 119 W. 57th St., New York City, N. Y., publishes "The Story of American Roads". The price is \$3.00.

New Plant Triples Output

Following the trend of industry to build away from A-bomb target areas, Flexible Tubing Corp. has opened the doors of its new home at Guilford, Conn. The plant will increase three-fold the production capacity for Spiratube, flexible tubing, flexible duct, and other products engineered by the company.

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HI-LECTRIC CONCRETE VIBRATOR

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JAHN Heavy Duty TRAILERS

FROM 5 TONS TO 100—

**YOU CAN DEPEND ON THESE
HEAVY DUTY FEATURES**

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WHETHER your load weighs 5 tons or 100, you can depend on a Jahn Trailer for fast, safe transportation to your next job. They're famous for the rugged construction that means strength and stamina under the toughest conditions. Smooth, reliable, equalized brakes provide that extra margin of safety.

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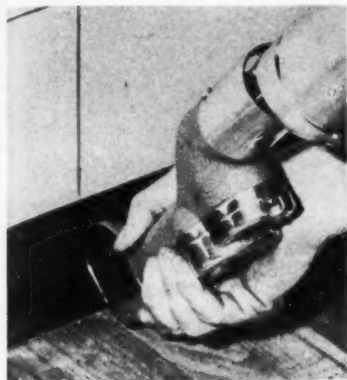
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CEDAR RAPIDS



The R. C. S. Super Saw fits any 1/4 to 5/16-inch drill and on any compressed-air or flexible-shaft equipment.

A New Power Saw Works on Hand Drill

A new all-purpose power saw designed to fit on any heavy-duty 1/4 or 5/16-inch drill, and on any compressed-air or flexible-shaft equipment, has been developed by R. C. S. Tool Sales Corp., 25 N. Ottawa St., Joliet, Ill. The blades for this saw are designed to cut through many materials: wood, Transite, fiber board, galvanized iron, sheet metals, cable, pipe, wire, etc.—and along any cutting line: curves, angles, circles, etc. The company points out that no starting hole is needed with the R. C. S. Super Saw.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 696.

A Plexiglas Panel Cuts Glare in Cab

A new use of acrylic plastic is contributing to efficiency, safety, and comfort in materials handling. New models of the diesel-electric cranes made by the American Hoist & Derrick Co., 63 S. Robert St., St. Paul 1, Minn., are equipped with a dome section of green Plexiglas in the front quarter of the cab roof. The transparent plastic provides full visibility upward as well as to front and sides, while shielding the operator from sun glare and enabling him to watch the boom's movements without eyestrain. The dome's resistance to breakage is excellent, the company claims.

The roof sections are formed from single sheets of green transparent Plexiglas, 1/4 inch thick. Lugs cemented on the inside of the roof facilitate clamping the formed sections to the cab. Double-channel rubber pinch molding is used to provide a weather-tight seal between the plastic sheet and the steel panels of the cab. The acrylic-plastic sections are formed by Plastics, Inc., 224 Ryan Ave., St. Paul,



A panel of green Plexiglas in the front of the cab roof allows the operator of the new American Hoist & Derrick Co. crane to watch the boom without eyestrain. The water-resistant acrylic plastic also protects against blows.

Minn. Plexiglas is a product of Rohm & Haas Co., 712 Locust, Philadelphia 5, Pa.

Further information may be secured from the Rohm & Haas Co. Or use the Request Card found in at page 16. Circle No. 555.

Metal-Working Alloys

A 32-page pocket-size booklet titled "Buyers Guide to the Complete Line of All-State Alloys and Fluxes for Welding, Brazing, Soldering, Cutting, Tinning" has been issued by All-State Welding Alloys Co., Inc., 273 Ferris Ave., White Plains, N. Y. It is designed to cover everything a buyer needs to know for selecting the alloy and flux to meet his needs.

Having a certain kind of metal to work on, you look for it in the first column of the booklet. In the next column your choice is narrowed by whether you are going to use torch, arc, or soldering iron. From this point on, guided by working temperatures,

strength, and comments related to your specific problem, you can select the rod that All-State recommends to meet your requirements most exactly.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 695.

Handles Johnson Equipment

Kemp Yorke is handling the C. S. Johnson line of concrete-batching and cement-handling equipment in southern California. His offices are in Los Angeles.

AEROIL HEET-MASTER KETTLES FOR ROAD & STREET BUILDING & REPAIR, NOW AVAILABLE IN 230, 330 & 500-GAL. SIZES



Save 50% on Fuel & Time

Now the famous HEET-MASTER Kettle, that does the work of two bottom fired kettles, is available in the larger sizes for big repair and paving jobs. (Ask for Bulletin No. 400RN.) Other Bulletins you'll want to have on file:—No. 171 Asphalt Surface Heaters & Paving Tool Heaters; 502 Aeroil 400 to 600 Gal. Utility Trailer Sprayers; 397Y All Steel Tool Boxes; 637 Cut Back & Emulsion Sprayers; 174 Burners & Torches.

Be sure you have these valuable FREE Bulletins handy for a full year against defects in workmanship and materials. Experience of over 33 years assures you of the finest and most economical equipment.

AEROIL PRODUCTS COMPANY, INC.

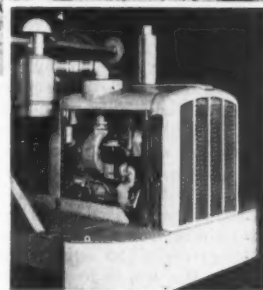
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Capable of digging speeds up to 136 inches per minute, Parsons 250 Trenchliner owned by Vanderver and Christian, Tyler, Texas, is powered with a 3-cylinder GM Series 71 Diesel engine delivering 89 H.P. at 1800 RPM. Mr. W. N. Christian says, "We are well pleased with this machine and the GM Diesel engine is giving excellent performance."



Faster Way TO DIG A DITCH

THIS General Motors Diesel-powered Parsons 250 Trenchliner, powered by a General Motors Diesel, took on the toughest kind of a pipe-trench job—8 miles of 42" trench, depth to 17 feet—through soil ranging from hard red clay to sand. Line of travel was from Lake Tyler to Tyler, Texas, through rough, hilly country, across numerous creeks with "soft" approaches. Jobs like this are a "natural" for GM Diesels because of their more efficient 2-cycle operation.

With power at every piston downstroke, these engines start at the press of a button—give instant response to widely fluctuating power demands—and cut fuel costs to the core.

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GENERAL MOTORS

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Oil Spray Protects New Concrete Paving

Is Item in New York State Dual-Highway Contract for 8-Mile Middletown By-Pass on Busy Route 17

• TO prevent scaling of concrete-paving surfaces from wintertime use of chemical de-icing compounds, the New York State Department of Public Works is spraying newly laid slabs with a protective oil coating right after they are cured. One of the important new pavements getting this treatment is the 8.14-mile Middletown By-Pass in Orange County, on which the pavement was completed last fall. The dual-highway cutoff, east of the county seat, runs from a point near Goshen northwest to Fair Oaks, thus eliminating what has long been a troublesome bottleneck for through traffic caught in the congested streets of Middletown.

This improvement actually was started over a decade ago when the Lane Construction Co. of Meriden, Conn., began grading and structure work on the new-location right-of-way back in 1940. Then the war came along, and construction was halted on the badly needed new route, with the contractor released from his obligations. In 1946 work was resumed when the State awarded a new contract for the grading to John Arborio, Inc., of Poughkeepsie, N. Y. This phase of the relocation was completed in 1949.

On May 15, 1950, the paving contract for the project also went to John Arborio, Inc., on the firm's low bid of \$1,525,966. Of the 8.14-mile length, there are 7.93 miles of dual reinforced-concrete highway of 9-inch uniform thickness, with each pavement 24 feet wide. The remaining 0.21-mile section is asphaltic concrete at the north end of the job connecting the new location to the existing Route 17.

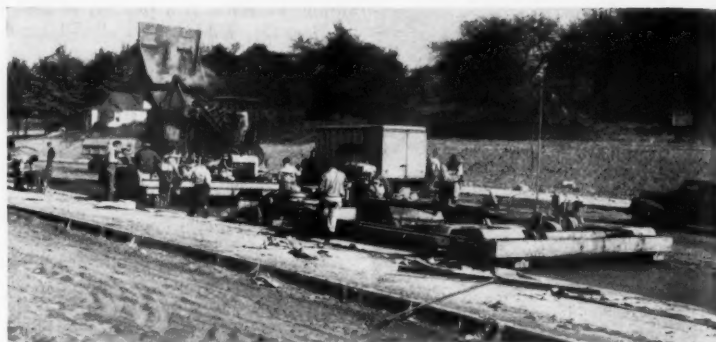
Gravel Base Course

The dual highway has a roadway width of 110 feet made up of the two 24-foot pavements flanked by 9-foot shoulders on the outside, and separated by a 44-foot mall. This wide divisor permits the addition of another 12-foot paving lane on each side to meet the demands of possible future traffic, and still leave a 20-foot center mall. The median strip is depressed at its center point anywhere from 12 to 18 inches below the grade at the edge of pavement. From the inside to the outside edge of the 24-foot concrete lanes there is a straight crown of 3/16 inch to the foot. The shoulders slope at the rate of 3/4 inch to the foot. Both cut and fill slopes are 2 to 1.

Underneath the 9-inch pavement is a 6-inch gravel base course that extends 12 inches beyond the slabs on each side. Base-course work was included in the paving contract, and run-of-bank material was obtained from pits no more

than a 1/2-mile haul from the job. The gravel was spread by motor graders and compacted by a 10-ton 3-wheel roller.

By June the base-course work was far enough along to permit the start of paving which began at the south end and proceeded to the north. The lower three-quarters of the project was done first while some houses were moved off the right-of-way at the upper end. Then the remaining quarter of the job was completed. For the final touch the slopes will be covered with 2 inches



C. & E. M. Photo

Arborio's lineup on the Middletown By-Pass—a MultiFoote 34-E Duomix paver, a Blaw-Knox spreader and transverse finisher, and a Koeberling Longitudinal Finisher.

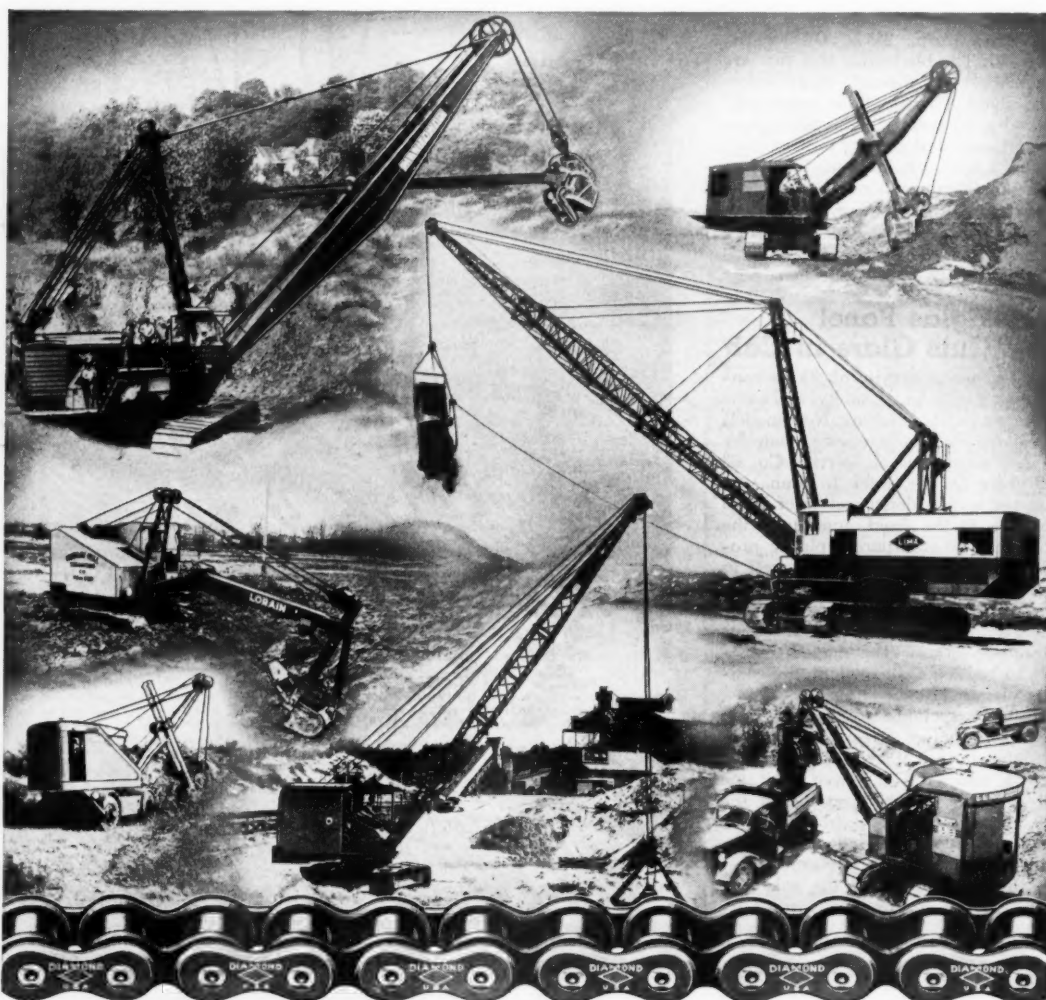
of topsoil, then seeded and mulched. Where necessary the ditches will be sodded.

Batch Plant

One of the contractor's first moves was the setting up of a batch plant

along the west side of the new alignment, about 2 1/2 miles above the south end of the job. Butler equipment was used, a 100-ton 3-compartment bin for the aggregate, and two bins for the cement. The conventional 400-barrel ce-

(Continued on next page)



Wherever Construction Machinery Is Used Diamond Roller Chains Are First Choice

• For their modern construction and road machinery, used on all kinds of jobs and in all kinds of weather, operators demand long-life dependability.

Throughout the rapid advance in construction machinery design during the past 30 years or more, much of the higher efficiency and output—and the long-life dependability—can be attributed to the increasing use of Diamond Roller Chains. They transfer

power from engine to main shaft and from there to countershafts without slip or creep—they withstand shocks and long hour service with minimum attention.

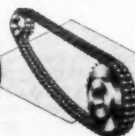
The wide preference for Diamond has been gained through consistent on-the-job performance.

DIAMOND CHAIN COMPANY, Inc., Dept. 487, 402 Kentucky Avenue, Indianapolis 7, Indiana.

Offices and Distributors in All Principal Cities

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ment bin, under which the trucks drove in picking up their loads, was augmented by an 800-barrel silo at the side. Bulk cement was supplied by the Universal Atlas Cement Co. from its plant at Hudson, N. Y. It was delivered to the job in closed trucks by Chet Hawley of Poughkeepsie, N. Y., a hauling contractor.

Crushed stone for the coarse aggregate was furnished by the Dutchess Quarry & Supply Co., a subsidiary of the contractor. It was quarried at Florida, N. Y., and hauled 6 miles to the batch plant. Sand came from the same supplier who had a pit with suitable material only one mile from the batch plant. The aggregate was stockpiled and loaded into the bins by a Northwest crane equipped with a 70-foot boom and a 1½-yard clamshell bucket.

As many as 25 trucks, holding two batches each, saw service in hauling the stone, sand, and cement from plant to paver, a maximum distance of nearly six miles. As the haul length decreased, the number of trucks hauling also diminished. The routine involved the backing up of the trucks under the aggregate bin, after which they ran under the bulk-cement bin to get their load of portland cement that had an air-entraining agent added at the mill. From that bin the trucks advanced about 50 feet to a platform by the side of the road where a bag of Rosendale natural cement was added by hand to each batch. Tarpaulins were pulled over the tops of the trucks to keep the cement from blowing away.

The Mix

A nine-bag batch of concrete was used on the project, containing eight bags of air-entrained portland cement and one bag of natural cement. The dry weights of a typical nine-bag batch were as follows:

Portland cement	752 lbs.
Natural cement	94 lbs.
Sand	1,700 lbs.
Stone, No. 1 and No. 2	1,453 lbs.
Stone, No. 3 and 3A	1,453 lbs.
Water	45 gals.

The sand, and the four grades of stone considered together, conformed to the following sieve sizes:

Sieve Size	Per Cent Passing	
	Stone	Sand
3-inch	100	....
2-inch	98-100	....
1½-inch	95-100	....
1-inch	40-50	....
¾-inch	20-25	....
½-inch	0-5	100
No. 4	....	90-100
No. 14	....	55-75
No. 48	....	10-30
No. 100	....	2-8

Water for the concrete was pumped out of brooks into two 3,000-gallon Mack tank trucks which transferred it to the paver. They also supplied the water for wetting down the grade before dumping the batches of mixed concrete.

Paving Operations

The contractor brought 5,000 linear feet of Blaw-Knox forms to the job, and was always much farther ahead of the paver with grade and forms than the 500 feet required by the specifications. Form pins were driven into the compacted base course with a Boyer air-cooled hammer powered by a Worthington air compressor mounted on a GMC truck. Any excess material between the 12-foot form lanes was

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C. & E. M. Photo

A Chevrolet dry-batch truck picks up a bag of natural cement at Arborio's batch plant. Its contents are covered with a tarp to keep the cement from blowing away. In the background is a Butler cement bin.

thrown off by a Buckeye RB Power Finegrader, and the 9-inch required depth was carefully checked with a scratch board or template. A Buffalo-Springfield 7-ton tandem roller did the

final compacting over the fine-grade.

Paving of the 24-foot roadways was done in 12-foot lanes which were tied together with ¾ x 14-inch hook bolts spaced on 5-foot centers along the lon-

gitudinal joint. Half the bolt length was screwed into the first lane that was laid, and the remaining half embedded into the concrete of the second lane.

(Concluded on next page)

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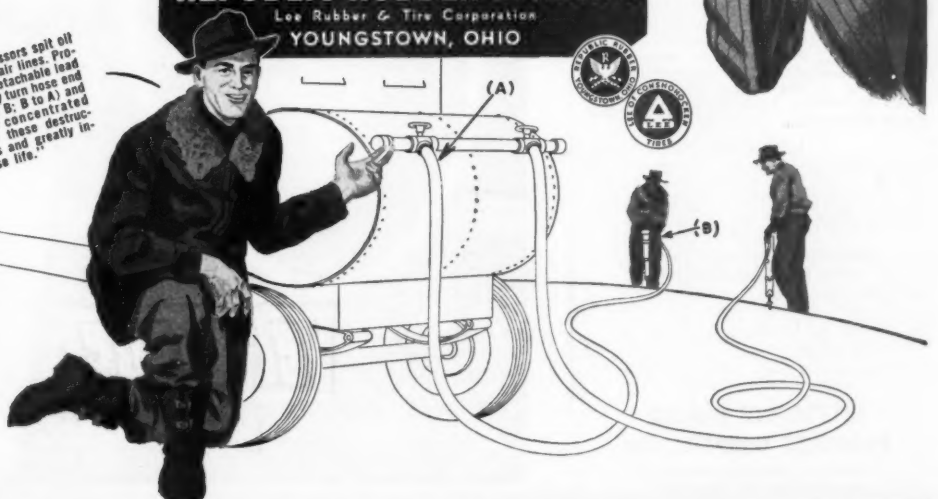
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Oil Spray Protects New Concrete Paving

(Continued from preceding page)

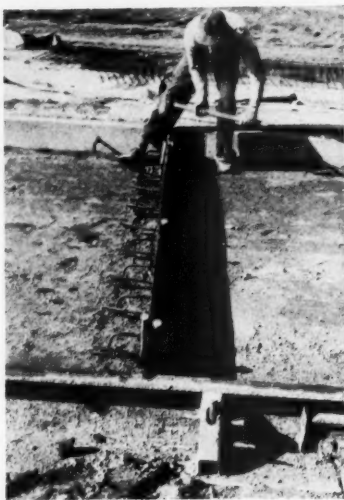
With the paver working outside the forms, expansion joints were laid out well ahead on 94½-foot centers. Rod-metal Flex-Type transverse joint supports were used, while the expansion material was a strip of impregnated felt, ¾ inch thick. The expansion material was covered with a metal cap that was later removed by the finishers.

Batches were mixed a total of two minutes in a MultiFoote 34-E Duomix paver equipped with a 35-foot boom, and then dropped on the grade in front of a Blaw-Knox paddle-type spreader. The spreader leveled off the concrete 2½ inches below the top of the forms, then backed up while the Wickwire Spencer mesh reinforcing was placed within the slab. More concrete was placed on top and struck off with the spreader even with the forms. The surface was then machine-finished by a Blaw-Knox dual-screed transverse finisher and a Koehring Longitudinal Finisher. After the mechanical longitudinal screeding had been completed, a 10-foot hand-operated smoothing lute was moved slowly over the surface of the concrete transversely from one side to the other to remove irregularities. No vibrators were used, but the concrete was spaded along the forms to prevent the formation of honeycombing.

Oil Spray

Behind the finishing machines the surface of the concrete was checked with a 10-foot straightedge, and any irregularities were removed with hand floats. As the concrete set up, the caps were removed from the expansion joints. In addition to edging the longitudinal joints with a ½-inch-radius tool, the transverse joints were edged with a ½-inch-radius edging tool. The surface was given a wire-broom finish, and then covered with Sisalkraft paper for curing. In the summertime the paper was left on for 4 days, but was left on longer in the cooler weather.

After the paper was removed, the



C. & E. M. Photo

A workman drives pins to support a Rod-metal Flex-Type transverse expansion-joint assembly on N. Y. Route 17.

surface of the concrete was sprayed with oil to prevent scaling from the use of salts for ice control in the winter months. The oil spray was a combination of petroleum distillate oil and petroleum mineral spirit distillate that was furnished by the Shell Oil Co. The contractor applied it with one of his own tank trucks equipped with a spray-bar at the rear extending out over the completed lane. Using a pressure of 40 psi, he sprayed the oil compound on at the rate of one gallon for every 17 square yards of surface. After the oil penetrated, a second shot was put on using the same amount as before. This oil is intended to penetrate and waterproof the top layer of concrete in order to prevent scaling and disintegration of the concrete surface. This waterproofed surface will permit the use of salts and chlorides as a safety measure on icy roads without damaging after-effects.

The last paving step was filling the joints with tar. Working a 9-hour day, the contractor averaged 1,800 linear

feet of 12-foot pavement five days a week with the single paver and finishing-machine setup.

Quantities and Personnel

The major items in the 8.14-mile dual-highway paving contract included the following:

Unclassified excavation	47,000 cu. yds.
Selected borrow	45,000 cu. yds.
Portland cement	94,280 bbls.
Natural cement	13,550 bbls.
Metal paving reinforcement	258,480 sq. yds.
Transverse joints	26,100 lin. ft.
Longitudinal-joint supports	19,650 ea.
Gravel foundation course	49,000 cu. yds.
Cement-concrete pavement	63,370 cu. yds.
Asphaltic concrete	2,385 tons
Topsoil	24,800 cu. yds.
Seeding and mulching	89 acres
Sod and sodding	17,020 sq. yds.

John Arborio, Inc., employed an average force of 115 men on the project under the direction of G. Liggera, Superintendent.

For the New York State Department of Public Works, Gerald Illenberg was Resident Engineer. The project is under the general supervision of J. S. Bixby, District Engineer of District 8 with headquarters at Poughkeepsie.

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The rugged construction of TRAFFICONES offers years of service under even the most excessive use. Expensive man-hours necessary to construct old-fashioned wooden markers, flags and other antiquated devices are now eliminated as there is no breakage or distortion from constant use.

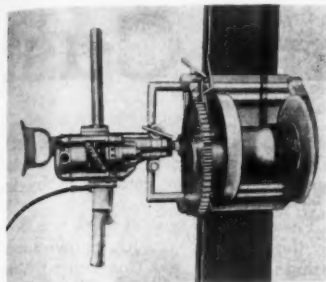
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An adapter kit now on the market locks the Skil Model 163 drill and the American Handiwinch in alignment to make a complete power hoist unit.

New Drill Adapter Powers 1/2-Ton Hoist

"Portable drill one minute—power hoist the next", says Skilsaw, Inc., 5033 Elston Ave., Chicago, Ill., of its 1-inch Model 163 drill combined with an American Handiwinch.

An adapter kit that requires no special tools for mounting locks the Skil drill and the Handiwinch in alignment, to provide safe large-capacity hoisting on many jobs. Designed for use in the field, in machine shops, garages, or warehouses, the new unit has a hoisting capacity of 1,000 pounds at 10 fpm. The Skil drill can be easily taken out of the hoist bracket for drilling jobs.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 694.

Two Mine-Car Loaders For Mucking Operations

A new 20-page catalog on the Models GD9 and GD14 mine-car loaders has been issued by Gardner-Denver Co., Quincy, Ill. These units have a loading capacity of 1 to 2 and 2 to 3 tons per minute, respectively. Complete and detailed specifications are given, along with illustrations of the units in all digging positions.

The GD14 comes in two sizes, both with a cleanup width of 77½ to 94 inches. One has a headroom clearance of 97 inches and discharges at a height of 63 inches; the other requires only 89 inches of headroom and discharges at a height of 57 inches. Track gages from 18 to 36 inches are available with the standard model; gages up to 42 inches are available for the higher-head model. The loaders are equipped with two adjustable stopblocks, one on either side of the undercarriage, and each provides four different cleanup ranges. Digging widths provided by these adjustable stops are shown in a diagram.

The GD9 loader comes in three different sizes, all measuring 32 inches in width. It has headroom measurements of 76, 79½, and 88 inches. The last size has a cleanup width of 64 to 102 inches; the other two, 63 to 93 inches. All three sizes may be equipped with wheels to fit track gages from 18 to 36 inches.

The booklet includes detailed information and illustrations of all component loader parts and construction features. It gives additional instructions, with black and white drawings, on methods of servicing the loaders with empty cars, on laying tracks and slide rails, and on ordering.

Bulletin MCL may be obtained from the company, or by using the Request Card at page 16. Circle No. 558.

Strata-Crete Sales Manager

Don Hall has been appointed Division Sales Manager for the sales of Strata-Crete and Strata-Seal made by Great Lakes Carbon Corp. of Los Angeles. The division he will be responsible for embraces California, San Juan Basin, Nevada, and Utah. His headquarters will be at the main offices of the Strata-Crete Division in Long Beach, Calif. Mr. Hall used to be Sales Manager for McCullough Toll Co.

Army Engineers Step Up Their Procurement Program

Here's the latest on the Army Corps of Engineers procurement program, as announced at a January meeting which Major General Lewis A. Pick held with industrial leaders.

1. The program has been revised upward from \$345,000,000 to \$779,000,000.

2. The total amount will probably be obligated by the end of this month, as follows: construction equipment, \$63 million; construction materials, \$101 million; utility equipment, \$14 million; mapping, surveying, reproduction, and special military equipment, \$11.5 million; bridges and floating equipment, \$19.5 million; Department of the Navy for the Corps of Engineers, \$38 million.

3. Additional procurement offices are being established to take some of the load off the Chicago and St. Louis offices.

4. Beginning April 1, procurement will be assigned as follows: construction equipment, the Chicago Procurement

Office; construction materials, the St. Louis Office; utility equipment, the Philadelphia District; mapping, surveying, precision, and special equipment, the New York District; bridging and floating equipment, the Pittsburgh District.

5. Engineer military procurement will normally be accomplished by negotiation.

6. Each procurement office will have

a small-business liaison officer to help small concerns win awards. (During the first five months of fiscal 1951, about 80 per cent of engineer procurement contracts went to small business, at a money value of \$193,000,000.)

This program, General Pick said, is subject to revision upwards as much as 200 per cent, as a result of requirement studies now being made by the Army.

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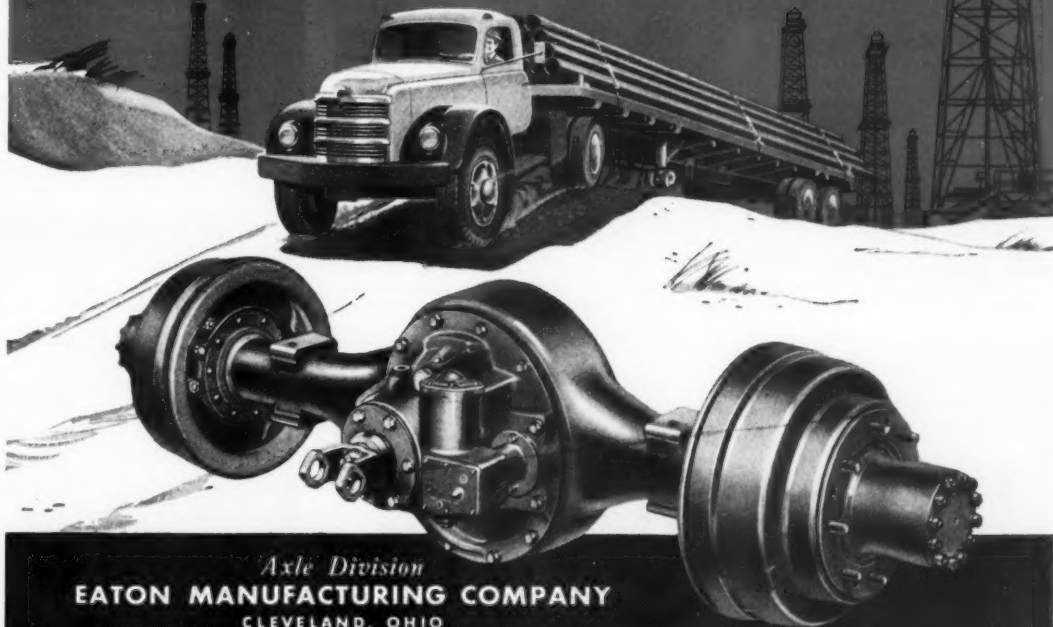
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make better time because they can shift into "high high". Between these two extremes, drivers have a choice of several ratios to meet the demands of road and load conditions.

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Concrete Mattresses Are Cast

By WILLIAM H. QUIRK,
Eastern Editor

Two Plants in Big Field Turn Out Concrete for Articulated "Squares" for Use Along the Mississippi

• ARTICULATED concrete mattresses for bank revetment along the Mississippi River in the general vicinity of Memphis, Tenn., were cast last year at four different locations. The work was done under contract to the Corps of Engineers, U. S. Army, Memphis District, as part of the construction program of the Mississippi River Commission. Casting fields along the right or west bank of the river are located at Caruthersville, Mo., and Helena, Ark. On the left or east bank of the Mississippi, the two remaining fields are in Tennessee—at Cates Landing and Richardson Landing, both above Memphis. The fields are located so that the mattresses, the finished product, are always moved downstream to where they are placed.

The biggest operation was at Richardson Landing, about 35 miles north of Memphis. There the Weymouth Construction Co. of Memphis turned out

120,000 squares (12,000,000 square feet) of articulated concrete mattress, and 8,600 squares (860,000 square feet) of an experimental V-type mattress at a contract cost of \$1,123,686. The same company also had a contract for casting 80,000 squares at Helena, Ark.

A square, the term used in revetment work, covers 100 square feet. A square of concrete mattress is 25 feet long x 4 feet wide x 3 inches thick, and contains 0.838 cubic yard of concrete. It is made up of 20 blocks, each measuring 14 x 46 inches, leaving a 1-inch space around the four sides for the articulated features of its construction. The wire-fabric reinforcing is embedded at mid-depth in the blocks, and consists of 3 wires running longitudinally through the square, and a single wire transversely through the center of each block. The wires join the blocks to-

gether, and also loop outside the blocks so that the squares may be connected to form the articulated mattress.

Large Casting Field

The casting field at Richardson Landing used by the Weymouth Construction Co. is owned by the Federal government, and consists of 53 acres of high flat terrain along the river front. This big expanse has a storage capacity of 100,000 squares. The Corps of Engineers acquired an additional 41 acres along the river immediately west of the present field, which will about double mattress-storage facilities at this site. Large storage area is necessary, for mattresses cast one construction season are usually placed on the banks of the river the following year.

Casting started the middle of April, 1950, at Richardson Landing and continued for five months during which

period some 120,000 squares were completed. The contract for this location was scheduled for completion by the end of the year.

Formerly this type of work was done by the Government with its own forces using this same field. Consequently, the steel forms, made by the Vulcan Iron Works of Memphis and originally employed in mattress casting, were placed at the disposal of the contractor. A large amount of reinforcing material also on hand, was furnished by the Government. The wire mat came in two types—a stainless-steel fabric supplied by the Allegheny Ludlum Steel Corp., and a copperweld wire from the Copperweld Steel Co. Like the rest of the construction materials, the reinforcing was delivered to the site by barge.

Concreting Materials

The Weymouth contract for Richardson Landing called for 135,000 barrels of portland cement. Portland cement in bulk was supplied by the Missouri

(Continued on next page)



1. Cement for the concrete mattress squares came to Richardson Landing via Weymouth Construction Co.'s barges. Here a rough unloader transfers it to a dump truck.



4. Before concreting began, the steel forms made by Vulcan Iron Works and owned by the Government were sprayed with oil from a DeVilbiss spray unit on a truck.



2. Aggregate arrived on 600-ton-capacity barges and was transferred to the hopper of an unloading barge by a P&H crane. Mack trucks backed out from shore for loads.



5. Here are the forms ready to receive concrete four sections tied together lengthwise to make a square. Squares were poured one on top of the other for 12 lifts.



3. Two plants batched and mixed concrete, with Butler cement bins, one with a Butler aggregate bin and one with a Blaw-Knox Favers mixer.



6. Nine trucks with shop-made hoppers hauled batches to the forms—here for the 12th and topmost tier. A man with a long bar tripped open the discharge chute.

For Mississippi Bank Revetment

Portland Cement Co. of St. Louis, Mo., and was picked up by the contractor at Memphis. It was transferred to his own river barges, of which he has four holding 4,000 barrels each. At the casting field two Hough 1/3-yard unloaders, whose operators wore respirator masks as protection against the cement dust, unloaded the big covered barges. They were moored with another barge between them and the shore, which permitted trucks to back out and get loaded from the side of the cement barges. Two dump trucks, 2-ton capacity, hauled the cement from the barge to the storage bins at the batching and mixing plants.

Sand and gravel aggregate for the concrete was supplied by the Central States Dredging Co. of St. Louis, which pumped the material from the river about 2 miles away from the casting field. The aggregate was washed and screened on the dredge, and loaded onto 600-ton barges which were towed to the landing. There they were tied up to an unloading barge brought in

close to shore. This latter barge was equipped with a P&H crane and clamshell which filled a hopper bin mounted on its deck. Mack trucks backed out a gangplank from the shore to the bin for a load of sand or gravel, and hauled it to huge stockpiles which were built up at the concrete plants. Two Caterpillar tractor-dozers, a D7 and a D6, dozed the material which was dumped at the edges of the piles.

Water for the concrete was pumped from the river by a CMC 4-inch pump set up on the barge from which the cement was unloaded. It traveled to the plant through a 3-inch pipeline which connected with the pavers. A 5,000-gallon storage tank was also kept filled with water as a reserve supply.

Two Complete Plants

Two complete plants were set up back to back along one side of the field for batching and mixing the concrete. One plant had a Butler 50-ton sand and gravel bin for aggregate storage, while the other was equipped with a

Blaw-Knox 35-ton storage bin. Two cranes with clamshell buckets—a General and a Bucyrus-Erie—charged the bins. Cement was stored in two Butler 200-barrel cement bins, one at each plant, with a receiving hopper into which the hauling trucks discharged their loads. Concrete was mixed in two 34-E pavers—a Rex dual-drum and a Koehring Twinbatch—with the concreting materials being chuted directly into the paver skips. Darex air-entraining agent was added to each batch at the rate of approximately 1 ounce per bag of cement to give an average 4 per cent air content to the mix. Batches were mixed 1 1/2 minutes in both drums.

Surface dry weights of a typical batch were as follows:

Cement	634 lbs.
Fine aggregate	1,481 lbs.
Coarse aggregate	2,776 lbs.
Water	343 lbs.
Total	5,234 lbs.

Batches contained 1 1/3 yards of concrete averaging 5 bags of cement to the cubic yard. Water averaged 6.1 gallons to the bag of cement, with the slump

running about 4 1/4 inches. The concrete produced weighed 149 1/2 pounds per cubic foot.

Sand and gravel used in the mix were graded as follows:

Sieve Size	Per Cent Passing	
	Gravel	Sand
1 1/2-inch	100	.....
3/4-inch	45-80	.....
3/8-inch	10-30	.....
No. 4	0-6	95-100
No. 16	.....	55-85
No. 50	.....	5-25

Concrete Placing

Paver booms were either set aside or disregarded as the concrete was chuted out from the mixing drum directly into hoppers holding a full 1 1/2-yard batch, and mounted on dump trucks. A fleet of 9 trucks was equipped with these shop-made hoppers for hauling the wet batches. The discharge chute from the truck-hopper was on the driver's side so that he could better gage his distance from the forms while placing the concrete.

(Continued on next page)



7. The chute from the truck hopper was on the driver's side so he could gage his distance from the forms. Trucks rolled along behind one another filling the rows.



8. Then workmen pulled the concrete into the corners of the blocks and leveled it off with shovels, steel rakes, and wooden floats.



9. A Stowe vibrator on a tractor-mounted arm which cantilevered out over the line of forms vibrated the concrete. The tractor is a Farmall.



10. Finally workmen smoothed the concrete with shovels. Kraft paper went down over each lift as it was poured. Hunt Process curing compound was used on the top lift.



11. Forms were stripped after 1 1/2 to 2 1/2 hours, and any traces of mortar and concrete were scraped off with spades before the forms were oiled again.



12. This is how the mattress will look on the banks of the Mississippi, though these sections are merely slope paving for a creek tank at one end of the casting yard.

Concrete Mattresses Cast for Retainment

(Continued from preceding page)

The shallow forms for the 3-inch-thick concrete mat were built with 2 x 3-inch steel angles, with each section of form containing five blocks. Thus four form sections were tied together lengthwise to make up a square. They were laid out in long parallel rows as the concrete placing progressed, with a 2-foot gap left around all four sides of a square. On this project the contractor had 656 sets of form squares. Before concreting began, the forms were sprayed with oil from a DeVilbiss spray unit mounted on a truck.

A row of forms was filled with concrete as the hopper trucks moved slowly along. A man with a long bar to trip open the discharge chute walked along with the trucks. Each form was not filled by one truck alone, but by several as they rolled along one behind the other. Then the concrete was pulled into the corners of the blocks and leveled off by hand with shovels, steel rakes, and wooden floats. A truck with a long trough then followed the hand finishers. This vehicle was called the surplus truck for it received any excess concrete off the top of the forms, and provided material should low spots occur.

Next the concrete was vibrated over its entire surface by a unique rig built for that particular purpose. It consisted of a Farmall rubber-tired tractor from the front end of which an arm was cantilevered out over the line of forms. This arm supported a 3/4-inch-thick sheet-metal plate, 13 x 42 inches, to which was welded the spud of a Stowe vibrator driven by a Briggs & Stratton gas engine mounted on a bracket at the rear of the tractor. Later on the contractor developed the unit still further, dispensing with the driving engine and working the vibrator from a power takeoff on the tractor. The arm supporting the plate and vibrator could be raised from ground level through a series of notches to operate at heights up to 36 inches from the ground.

This unit eliminated the work of four men who formerly had been required to pull the vibrator along by hand, lift it across the gaps in the forms, and carry the connecting hose. A final finishing followed the vibrator. This consisted simply of smoothing off the surface of the concrete with shovels, which was done by hand.

Twelve Lifts High

These squares of concrete were poured one on top of the other until 12 lifts had been finished, the top square being 36 inches above the ground. Forms were removed after 1 1/2 to 2 1/2 hours, depending on weather conditions. As they were stripped, any traces of mortar and concrete were scraped off with spades before the forms were oiled again. From 4 to 6 hours had to elapse before the forms were placed on fresh concrete for the next lift. As soon as the forms were removed from a lift, the surface of the concrete was covered with a double thickness of 50-pound Kraft paper. In covering one square a strip 26 feet long x 52 inches wide was required. After the top lift was laid, it was cured with Hunt Process, a membrane compound applied at the rate of 0.5 gallon to the square. The top layer of the squares was the only surface that was continually exposed.

One small but essential detail in the form construction was the use of gROUT plugs around the wire fabric connecting the blocks and squares. These were removed along with the forms, and their use insured the free movement of the concrete blocks. So long as the panels could bend freely, there was little trouble with breaking wire. With the dual concrete-plant setup,

the contractor averaged 1,178 squares a day, working from 8 to 9 hours. The working force numbered about 185 men. Haul roads for the delivery of material from the water front to the plant, and for the passage of trucks around the big casting field, were kept in shape by an Adams 511 motor grader. A tank truck was also on hand to settle the dust by sprinkling the roads with water. An important item of equipment was 500 pieces of tarpaulin, each 7 x 28 feet, to spread over the squares just poured in case of rain.

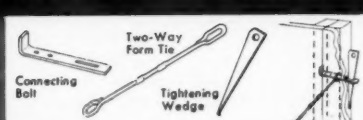
A creek bank at one end of the casting yard supplied some desirable terrain for laying a few sections of concrete mattress to serve as slope paving.

V-Type Mattress

The comparatively small amount of V-type concrete mattress included in the contract was cast at one end of the field with equipment furnished by the government, which had been experimenting with this design. The V gets

(Concluded on next page)


"We build more foundations at lower cost with SYMONS FORMS"



Simple sturdy hardware means fast erection and fast stripping. Without nails, forms last twice as long. Contractors report substantial savings in labor and material costs as well as important savings in time.

Panels with steel ribs every 12 inches are recommended for heavy pressure. Ribs allow 1500 pounds pressure per square foot.

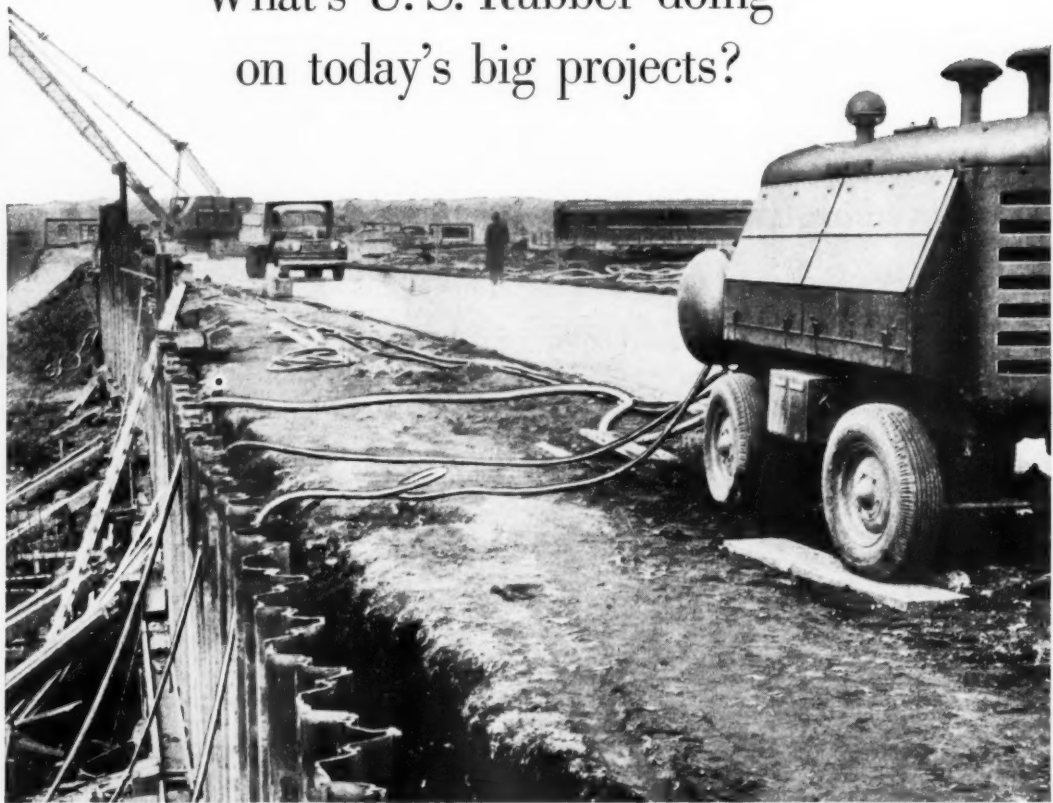
Pine, Plywood, Plastic Plywood, or Magnesium forms are available—also hardware to build your own... Forms may be rented with purchase option. Send plans for engineered form layout. Write today for your Catalogs on Symons Forms, Safety Shores, Column Clamps and Accessories.



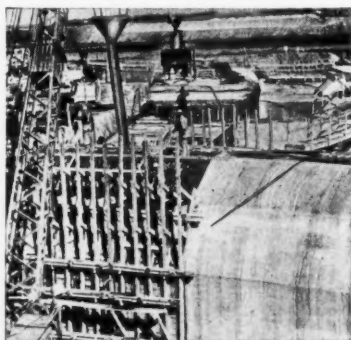
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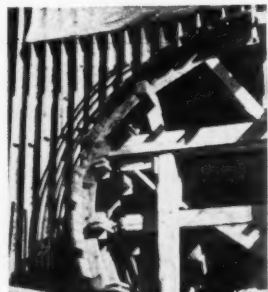


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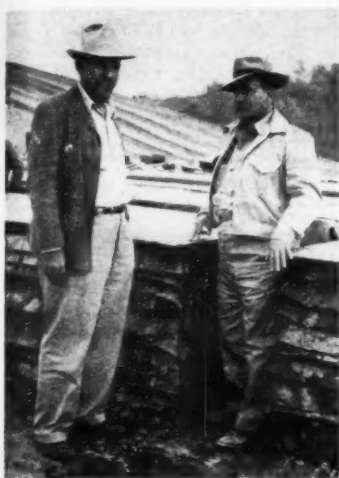
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C. & E. M. Photo

Joe L. Koch, left, was Resident Engineer on the Weymouth job for the Corps of Engineers, and Charles Norris was contractor's Superintendent.

ment such as steel tail lines, lanyards, snaps, and bos'n board.

This literature may be obtained from the company by requesting Bulletin CF-26, or by using the Request Card at page 16. Circle No. 693.

Data on Clamshell Buckets

All-welded clamshell buckets are described in an 8-page catalog prepared by C. S. Johnson Co., R. F. D. No. 1, Champaign, Ill. Listed in the booklet are three types of clamshell buckets in sizes $\frac{3}{4}$ to $2\frac{1}{2}$ cubic yards.

The catalog points out that cable reeving changes on Johnson buckets can be made quickly to match working conditions. The upper sheave block accommodates 2, 4, or 6-part lines. Large-diameter closing sheaves run on needle bearings to reduce friction losses. The lower sheave block is of open-type construction so that stones and dirt from heaping loads fall away from the cable and sheaves.

A full page in the catalog tabulates

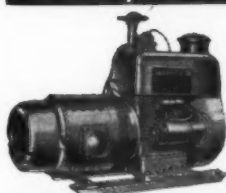
condensed specifications, listing capacity, weight, dimensions, sheave, and cable data for each size and type of Johnson clamshell. Action photographs are also included, along with a summary of the manufacturer's complete line of concrete-batching and cement-handling equipment.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 599.

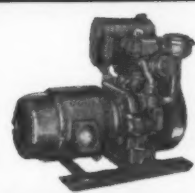
Carolinas AGC Moves

The Columbia Service office of the Carolinas Branch of the Associated General Contractors of America, Inc., and the South Carolina Licensing Board of Contractors, has moved into new offices in the Builders Bldg., 1639 Blanding St., Columbia, S. C. The proper mailing address for the agencies is P. O. Box 5325, Columbia, S. C.

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its name from the shape of the key along the sides of the blocks as they are fitted together into squares. These squares also measure 25 feet x 4 feet x 3 inches, are reinforced with steel fabric through the center, and are laid after the manner of concrete pavements in widths of 25 feet. Strips are run out in 1,200-foot length using such road-building machinery as paver, concrete spreader, and finisher. The greater exposed area of the V-type mattress is cured with water.

Personnel

For the Weymouth Construction Co. of Memphis, Charles Norris was Superintendent at the Richardson Landing Casting Field.

The Corps of Engineers, U. S. Army, was represented on the project by Joe L. Koch, Resident Engineer. The Memphis District is headed by Col. L. H. Foote, District Engineer. Lt. Col. R. C. Bahr is Executive Officer.

Welded Deck Highway Bridges

New ideas on welded-bridge design, and practical shop and field suggestions, are contained in the new book "Welded Deck Highway Bridges" which was edited by James G. Clark, Professor of Civil Engineering at the University of Illinois. The designs are some of those submitted in the 1949 "Welding Bridges of the Future" award program of The James F. Lincoln Arc Welding Foundation, which offered awards for the best designs of an all-welded 120-foot-deck highway bridge.

The program emphasized new designs, new methods of fabricating and erecting, new steel sections—all to result in better bridges at less cost made with less steel. The book includes most of the new and important ideas presented in the program. There are over 100 detail drawings.

The book is published by The James F. Lincoln Arc Welding Foundation, Cleveland 1, Ohio, and costs \$2.00 in the United States, \$2.50 elsewhere, postage prepaid.

Safety-Belt Bulletin

The complete line of M.S.A. safety belts is described in a new 4-page bulletin issued by Mine Safety Appliances Co., Braddock, Thomas, and Meade Sts., Pittsburgh 8, Pa.

The bulletin is divided into sections describing body-type belts, harness-type belts, bridge and structural-steel-workers' belts, linemen's belts, and miscellaneous safety belts, which include Scotchlite reflector types. The belts are made of both leather and webbing material. Specially treated webbing offers protection against paint, mildew, and acid conditions. The catalog also illustrates and describes accessory equip-

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Aerial Photographs Save Time, Cut Cost

Reports of Seven Top Highway Men at ASP Meeting Indicate
Wide Use of Photogrammetry in the Highway Field

• **THOUGH** everything about photogrammetry from lens calibration to its use for the Inchon Landings was discussed at the 17th Annual Meeting of the American Society of Photogrammetry, its applications in the highway field held prime interest. The large attendance at the meeting this year was probably due in good measure to the fact that it was held in Washington, D. C., January 10-12, at the same time that the Highway Research Board met. In this way many men were able to attend both meetings.

At the Thursday morning meeting William T. Pryor, Highway Engineer of the Bureau of Public Roads, opened the highway conference with his paper, which was also the keynote of the afternoon symposium—"Photogrammetry as Applied to Highway Engineering". Mr. Pryor, in the introduction to his report, stated that "though the application of photogrammetry to highway engineering is an intensely interesting subject, it is one about which we do not have all the answers because many of the obvious practical uses in the highway field have not been fully explored." Mr. Pryor and the panel speakers did much, however, to describe the scope of the field as it exists today. More than that, they offered evidence that this technique can solve common problems more economically than ground methods can, as well as some problems unsolvable by any other methods.

Papers delivered at the highway session ranged in subject matter from the use of photogrammetry to provide four alternate routes, each 2,000 miles long, tracing the course of the Mississippi River, to computing small drainage areas for culvert design. Full details were given on the methods of application, personnel required, unique solutions, limitations of use, and time and cost analyses compared to standard field methods.

Cost Comparisons

One of the most detailed papers was that given by I. W. Brown, State Manager, Traffic and Planning Division, Mississippi State Highway Department. The first use of aerial photos by the Department, 19 years ago, was on an 18-mile new location, using photos borrowed from one of the local counties. "This one location saved from \$2,000 to \$2,500 in establishing the center line and tying into section lines and property corners", Mr. Brown said. He added, "This does not take into account the possible saving on earthwork quantities due to the ability to better avoid low depressions [in the swampy delta areas] not to mention the overall superior location."

Comparative costs on a more extensive job were also given by Mr. Brown. Quoting in part from the report: "We have . . . the actual cost of a field location survey without the use of aerial pictures and the cost, through the same section of country, with the use of aerial pictures. Also we have a definite cost on the saving in grading for a roadway [on these two sections]. These samples are rather interesting because at the time this was all done there was no forethought as to a possible comparison to be made either then or at some later time."

Both samples were for a relocation on a 22-mile section between Natchez and Vicksburg, Miss. The comparison follows:

Without Aerial Photos
(Survey made between June 26 and
December 6, 1933)

Length of line	12.35 miles
Cost of survey	\$3,645.00
Cost per mile	295.14

With Aerial Photos
(Survey made between January 11 and
March 2, 1936)

Length of line	14.19 miles
Cost of survey	\$1,339.86
Cost of photos	675.00
Total cost	2,014.86
Cost per mile	141.99

"Another consideration that could

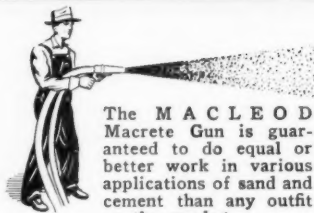
well be taken into account in computing the difference in the cost of making the two surveys is the difference in the salary scales—up 26 per cent [in the intervening time]."

Comparison of the excavation on this project was of considerable interest. Mr. Brown explained, "The difference in the excavation quantities, or the sav-

ing on the location made with the aid of aerial photos, was 15,336 cubic yards per mile. The excavation was contracted at 23 cents per cubic yard. This represents a saving of \$3,527.28 per mile or a total for the project of \$50,052.12."

The cost-saving features of aerial
(Continued on next page)

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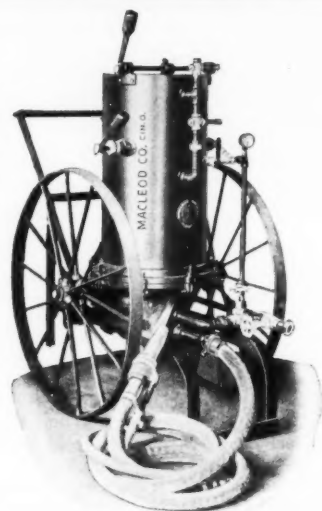
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photos were also reported by E. C. Houdlette, Location and Survey Engineer, Massachusetts State Department of Public Works. He said, "The average cost of the aerial topomaps was \$680.00 per mile for a strip 6,000 feet in width in comparison with the average cost for [ground] reconnaissance survey, including field and office, of about \$1,500 per mile for a strip 500 feet in width."

Mr. Houdlette reported on the curriculum given selected personnel at Harvard University to place them "in a position to use aerial photographs . . . with assurance and precision". He also detailed a full set of specifications, established by the Massachusetts Department of Public Works, to obtain the best photos available when outside aerial surveys are contracted.

No Limit to Photo Use

Edward T. Telford, Engineer of Design, California Division of Highways, offered examples of extensive use of photogrammetry by his department. "Semicontrolled mosaics", he said, "help greatly at conferences and public meetings. Photogrammetrically compiled contour maps offer very satisfactory service in location studies. Contemplated is the use of these maps in locating urban freeway projects 5 to 10 years in advance of the construction, thereby notifying land owners what part of their property will be needed for the freeway and how best to develop the remainder." He also mentioned that photo prints have been effective for reconnaissance even in the heavily forested redwood area. Locating material sites, particularly sand and gravel deposits along rivers, is still another application made in California.

"After letting a contract based on excavation quantities obtained from aerial photographs, recalculation disclosed a variation of less than 2.5 per cent", Mr. Telford reported. Mr. Houdlette cited a similar experience in Massachusetts. Comparing surveyed cross sections with aerial topomaps there was a 2.6 per cent difference on the embankment and 3.3 per cent on the cut.

Said Mr. Telford, "It is believed possible that we may some day use excavation quantities developed from aerial contours for contract payment. In brief," he summarized, "there is no part of highway planning in California, from advance planning and public relations to right-of-way and final design, that has not made some advantageous use of information secured by photogrammetric methods."

Marion W. Landon, Route Planning Engineer, Michigan State Highway Department, supported this idea in his report detailing the activities in that state. Michigan has used aerial surveys for work in route planning, field surveys, design, soil and drainage studies, traffic analysis, and right-of-way acquisition. The range of usefulness of air photos is undoubtedly extended by the short courses given by the Department twice a year. Personnel attending include route-planning, survey, design, construction, bridge, and soils engineers. Mr. Landon explains that they have prepared their own textbook, "Highway Photogrammetry", for these courses.

Other states were interested to learn

of Michigan's research in reproducing aerial photos by ozalid and blueprint methods. "Our results have been very satisfactory", Mr. Landon said.

Nationwide Questionnaire

Jon S. Beasley, Photogrammetric Engineer, State Road Department of Florida, indicated the extent to which photogrammetry is playing a part in the activities of state highway departments throughout the nation. His data resulted from a 4-page questionnaire mailed by the Florida Department to all other state highway departments. Replies were received from 47 states—with answers that ranged from a simple statement that photos were not used, to completely filled-out questionnaires with valuable additional information.

The first part of Mr. Beasley's paper revealed that some 26,000 miles of new highway location will probably be surveyed this year, at a cost exceeding \$27,000,000. "Aerial photography", he said, "could contribute substantially

(Concluded on next page)



Ray L. Blair & Co. of Spokane will move over 1,000,000 cubic yards of earth and rock to relocate Yellowstone Highway, U. S. 10, between St. Regis and Cabin City, Mont. Here a Northwest shovel bites its way around Camel's Hump as Turnarockers powered by GM diesels move up for heavy loads.



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Aerial Photographs Save Time, Cut Costs

(Continued from preceding page)

and economically to the location of [some] 20,000 miles." Of the 40 states that have at one time or another used aerial photography for highway location studies, only one of the states concluded that the method was not satisfactory. The report also indicated that 33 states have purchased photographs from Federal agencies. Although the scales were considered accurate enough and the image sharpness satisfactory, the photos obtained from the agencies were not as up-to-date as desired in all cases, the states reported. The concluding portion of Mr. Beas-

ley's paper was most stimulating, for it outlined tentatively a nation-wide educational program to be undertaken by the Society to promote further use of photogrammetry in highway work.

The accuracy of detail that can be obtained with photogrammetric maps was stressed by Curtis J. Hooper, Director of Planning of the Connecticut State Highway Department. "Almost unbelievable" was the terminology used. He said, "For planimetric detail on 40-feet-to-the-inch maps, it has been found that buildings, fences, and virtually everything which can be seen from the sky can be plotted . . . within the accuracy normally obtained by ground survey methods. Ninety per cent of the contours will be accurate within 1/2 contour interval and the

other 10 per cent within a whole contour [using a 1-foot contour interval]. . . . Such accuracies have been obtained . . . in three contracts through the past three years. Advantages are the ability to supplement existing survey personnel, shorter time required, and costs no greater than ground surveys."

A Must for Some Jobs

For special studies in the highway field, often no other method will serve as well as photogrammetry, or serve at all. This was one of the points forcefully brought home by Mr. Pryor. Where reconnaissance is of an extensive nature and the time is short—as is often the case with interstate parkways and toll roads—aerial photos offer the only method of determining

all alternate routes, and usually at lowest cost.

The use of this method in preparing four alternate routes, each nearly 2,000 miles long, for the proposed Mississippi River Parkway, was outlined in detail by Mr. Pryor. To emphasize the magnitude of the task, which was to be completed in two years, Mr. Pryor pointed out that the survey was required to show "the relationship of the routes to each other, to the Mississippi River, its tributaries, and other waters; to existing highways, cities, public lands, parks; and to historical, archeological, scenic places, and other areas of interest." As Mr. Pryor remarked later, "The survey was of such scope that accomplishment within the time and budget limit set would be impossible without the aid of photogrammetry."

Handbook of Information On Aggregate Production

The tenth edition of "Facts and Figures", a pocket-size booklet of information on crushing, screening, washing, and materials handling, is available from Pioneer Engineering Works, Minneapolis 13, Minn. Its 62 pages contain tables on stage of reduction and capacities of crushers, sizes and capacities of screens, and information on the selection of conveyors and feeders. It gives power requirements for various types of equipment, and tables showing how to select drives. Charts are included, showing the percentage of each size of stone in the product of a crusher, either open or closed circuit. There are also tables of miscellaneous information on weights, measures, conversion factors, trigonometric functions, square and cube roots, etc.; tables on electric power; and tables for the bituminous contractor.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 553.

Re-Usable Steel Hose Ends

A revised and more complete edition of the Weatherhead catalog on re-usable steel hose ends and industrial hose, No. H-1451-A, is available from The Weatherhead Co., 300 E. 131st St. Cleveland 8, Ohio. The new edition covers additional sizes of Weatherhead hose couplings in the medium, medium-high, and high-pressure types.

It describes hose construction and tells the amount of hose to cut in order to make complete assemblies of the right lengths for each type. It gives assembly instructions, with illustrations, for the different types. It also includes complete technical information on Weatherhead SAE 37 and 45-degree flare adapters.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 598.

Business Under the ECA

Foreign business under the Economic Cooperation Administration is obtained through contact with the nation being helped and not through the ECA. This point was made by George H. Knutson in a speech before the American Society of Civil Engineers in New York. Mr. Knutson is Executive Chairman of the Projects Committee of ECA's Industry Division.

Business men may obtain leads on possible ECA projects by contacting a member nation, or one of its agents, particularly the technical assistants attached to most member-nation embassies. A manufacturer whose equipment is being used by the member nation may also be helpful.

When a qualified engineering firm finds out about a project, it may obtain a conditional contract with the member nation. This contract goes into effect when money for the project is approved by the ECA.



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Marmon-Herrington All-Wheel-Drive Fords give you virtually the tractive power of crawler tractors, plus truly amazing speed and maneuverability. Masters of deep mud, sand or snow, steep hills and mountain grades, they handle toughest assignments with astonishing speed, ease and economy.

There are 30 Marmon-Herrington All-Wheel-Drive Ford models in all. Wheelbases range from 110" to 220"—G.V.W. from 5,300 lbs. to 35,000 lbs.—forward speeds from 4 to 10.

For a demonstration of almost unbelievable performance-ability, see your Marmon-Herrington dealer—or write for literature.

MARMON-HERRINGTON COMPANY, INC.

1523 W. Washington St., Indianapolis 7, Indiana

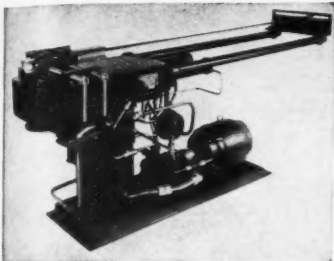
MARMON-HERRINGTON
All-Wheel-Drive

SERVICE AVAILABLE AT FORD DEALERS EVERYWHERE . . .



Marmon-Herrington All-Wheel-Drive Fords are, for the most part, built of standard Ford Parts. Consequently, fast, efficient, low-cost maintenance and repair service is available at Ford dealers everywhere. When, occasionally, special parts are required, they are quickly obtainable through Marmon-Herrington distributors, conveniently located in principal cities the world over.

FORDS



The new hydraulic Wallace bender, Model No. 800, designed to save space but give plenty of power.

New Hydraulic Bender

A small compact bending machine, Model No. 800, is available from Wallace Supplies Mfg. Co., 1300 Diversey Parkway, Chicago 14, Ill. The new machine, 21 inches wide x 34 inches high x 78 inches long, has a capacity of 1 1/4 inches OD by No. 16 BWG steel tubing. It is powered by a standard 2-hp 220-240-volt 3-phase 60-cycle motor furnished with the machine.

A single lever, when pushed down, causes the bending arm to swing around to the degree of bend selected and stay there until the operator has removed the bent part, then the lever is moved up and the arm swings back to its original position. The bending die is held on by spring clips, for easy changing; it is a combination die with four different sizes, one to each side. The bender can be changed from a right to a left-hander.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 616.

Heavy-Duty Diesels

A new line of heavy-duty diesel engines consisting of six models from 145 to 220 hp has been announced by the Murphy Diesel Co., 5319 W. Burnham St., Milwaukee 14, Wis. The engines are designed to operate at continuous speeds up to 1,400 rpm. This operating speed makes possible their application in many services including those requiring torque-converter power transmission, the company says.

The Murphy design features unit fuel injection, four valves per cylinder, and a hydraulic Servo-type governor.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 583.

Data on Chain Drives

A new handbook and catalog containing helpful information on chain drives has been announced by Atlas Chain & Mfg. Co., Philadelphia 24, Pa. It contains suggestions on how to install, maintain, and operate roller chain. It tells how to plan chain-drive layouts and offers valuable hints on lubrication and roller-chain selection. It also includes length-conversion tables, horsepower-rating charts, list prices, and specifications for all types of roller chain and extended-pitch conveyor chain.

This literature may be obtained from the company by requesting Catalog ARC-51-PR, or by using the Request Card at page 16. Circle No. 619.

Data on Cast-Iron Welds

A new data sheet on the applications of EutecRod 14 FC, a welding rod for high-strength welds on cast iron by means of oxyacetylene torch, is offered by Eutectic Welding Alloys Corp., 40 Worth St., New York 13, N. Y. Illustrated with several case histories of typical jobs, the data sheet also lists physical properties of the alloy. Completed welds achieve a tensile strength of up to 50,000 psi, the literature says.

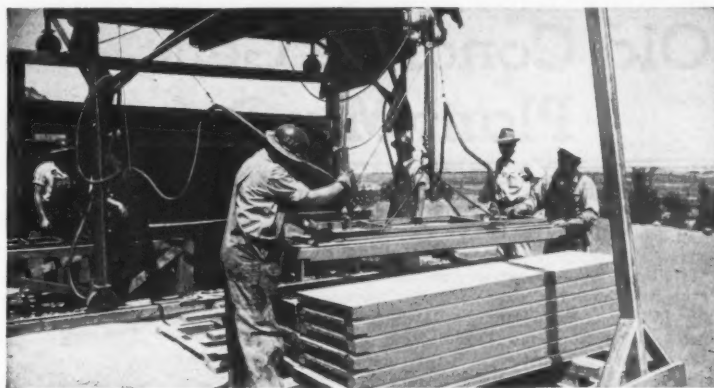
This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 567.

Will Certify Access Roads

Secretary of the Interior Oscar L. Chapman is the official who will certify to the necessity of access roads in the exploration and development of defense metal and mineral deposits. Certification responsibility was transferred from the Secretary of Commerce because, under the Defense Production Act of 1950 and a subsequent executive order, the Defense Minerals Administration was established in the Department of the Interior to "encourage the exploration, development, and mining of critical and strategic minerals" for national mobilization.

New Malsbary Executives

A. E. McIntyre has been elected President and Walter Taylor Vice President of Malsbary Mfg. Co., Oakland, Calif., manufacturer of steam-cleaning equipment. McIntyre has served as General Manager since 1949 and Taylor is Plant Manager.



THE VACUUM LIFTER STACKING CONCRETE SLABS. VACUUM CONCRETE PRECASTING LOWERS CONSTRUCTION COSTS. WRITE FOR INFORMATION AND LITERATURE.

VACUUM CONCRETE, INC.

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PHILADELPHIA 4, PA.

Put this *PUSH* in Your Pocket!

The "big push" you get with an Oliver "FDE" Crawler and Heil Cable Dozer pays off in more dirt moved per day... more profit for your pocket!

Look at the profit-making advantages this "dirt-moving" team gives you:

- ★ Rugged Oliver power that puts more "push" behind the blade.
- ★ Oliver exclusive steering principle that always lets you travel a straight line, regardless of the side-pull of off-center loads. No "jackknifing."
- ★ Cable power control unit that assures constant operating speed for quick, accurate control of moldboard action. Available in front or rear mounted units.
- ★ No operator fatigue. "Air steering," an optional Oliver feature, lets the operator control the tractor with just 2 fingers of one hand. No "footwork" required. Finger-tip dozer control unit on operator's right makes dozer operation easy. Operator faces forward in a natural, non-tiring position. Excellent visibility.

Check these and the many other advantages of Oliver Crawler Tractors and Heil Cable Dozers with your Oliver Industrial Distributor. He'll show you why you'll profit with the "big push."



Oliver air steering "FDE" with Heil Cable Dozer clearing the way for a new road.

THE OLIVER CORPORATION

Industrial Division: 19300 Euclid Avenue, Cleveland 17, Ohio

A complete line of Industrial wheel and crawler tractors



Old Concrete Gets Plant-Mix Refresher

Crushed Stone Used in Both Courses on Detroit's 4.3-Mile Grand River Avenue Resurfacing Project

• ONE of several major resurfacing projects completed this past year by the Michigan State Highway Department in metropolitan Detroit was a 4.3-mile stretch on Grand River Avenue. This heavily traveled artery is also designated U. S. 16, a direct route from Detroit, Michigan's largest city, to Lansing, the state capital. The improvement was on the west-bound roadway of a dual highway which is divided by a wide grassy median strip; each pavement is 40 feet wide. The east-bound roadway is expected to be resurfaced in future improvements.

A contract for the work was awarded by the Michigan State Highway Department to the Cooke Contracting Co. of Detroit on its low bid of \$209,716.75. Besides the 4.3 miles on U. S. 16, the contract included a short 0.3-mile job on Telegraph Road, U. S. 24, from Seven Mile Road to where it intersects U. S. 16. The improvement on U. S. 16, called locally the Detroit-Farmington Road, runs from Grayfield to the Farmington cutoff. It is in the cities of both Detroit and Livonia, and extends from Wayne into Oakland Counties.

The existing concrete pavement, 40 feet between curbs, is 9 inches thick, with a surface that had become broken up with years of usage. The resurfacing contract called for two courses of bituminous concrete, a binder or base course laid at the rate of 175 pounds per square yard, topped by a wearing course weighing 120 pounds to the square yard. The total average compacted thickness of the plant-mix is 3 inches. Work got under way in August 1950, and was completed the following month.

Crushed Stone in Mix

Up until 1950 the Highway Department required that only 50 per cent of the coarse aggregate in bituminous binder course be crushed material. Present specifications, however, call for 100 per cent of the coarse aggregate to be crushed, in order to obtain a more durable bituminous pavement. Coarse aggregate for bituminous-concrete wearing course also calls for 100 per cent crushed material. The 9A stone used in the binder came from Drummond Dolomite, Inc., of Drummond Island in the upper peninsula of Michigan, and was delivered to Detroit by lake barge. From there it was trucked to the contractor's asphalt plant which was set up on a siding of the Chesapeake & Ohio Railroad just off Van Born Road near Wayne.

The American Aggregates Co. of Oxford and Green Oak, Mich., supplied the 25A stone for the wearing course,

as well as sharp or coarse sand making up part of the fine aggregate. Delivery to the plant was by truck. The fine aggregate consisted of one part of this sharp sand and three parts of local sand which was available near the asphalt plant. Used alone the local sand did not meet the gradation specifications; hence it was blended in with the local variety obtained from the Hatfield pit at Wayne and Warren Avenues near the plant.

Fly ash in small amounts was put into the wearing-course mix to increase



C. & E. M. Photo

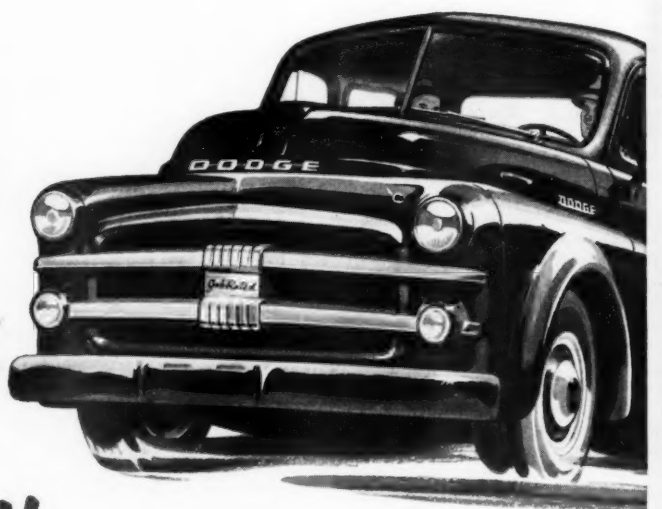
An Adun Black Top Paver lays binder or base course on Grand River Avenue in Detroit.

the contents of fines. This material all passed the No. 200 sieve. It was procured from the Detroit Edison Co. and was delivered to the plant by trucks

carrying 20 tons. It was stored in a 40-ton silo from which it was raised in an enclosed elevator to a 7-ton storage bin.

(Continued on next page)

"Job-Rated" for CONTRACTORS



Brand new DODGE "Job-Rated" TRUCKS

The trucks that do the most for you!

More than 50 BRAND-NEW improvements... including

NEW! SMOOTHER RIDE with new, "Oriflow" shock absorbers—standard equipment on 1/2-, 3/4-, and 1-ton models.

NEW! EASIER LOADING with lower ground-to-floor height—on all models through 2 tons.

NEW! EASIER BAD-WEATHER STARTING with new moistureproof ignition and high-torque starting motor.

NEW! MORE ECONOMICAL PERFORMANCE with higher (7.0 to 1) compression ratio—on all models through 1 ton.

NEW! SMOOTHER ENGINE IDLING with "hotter" spark plugs; on all models through 1 ton.

BRAND-NEW POWER—You get more power than ever—engineered for your job! Eight great engines—with net horsepower stepped up as much as 20%! You get more of the right power for your needs—with top economy! Yet, with all their extra value, new Dodge "Job-Rated" trucks are priced with the lowest.

BRAND-NEW EASE-OF-HANDLING—You can turn new Dodge "Job-Rated" trucks sharper... maneuver them more easily. New shorter turning diameters! New worm-and-roller steering gears! All this—plus cross-steering, wide front tread and short wheelbase.

BRAND-NEW BRAKING SAFETY—New Dodge "Job-Rated" trucks are the trucks with new molded, tapered Cyclebond brake linings! New extra-quiet action! New extra-smooth, extra-sure stopping! New longer lining life! (On new 1 1/2-ton and up trucks, except air brake models.)



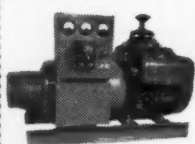
PLUS THIS EXCLUSIVE! gyrol Fluid Drive available on 1/2-, 3/4-, and 1-ton, and Route-Van trucks.

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THE TRUCK THAT FITS YOUR JOB... A DODGE "Job-Rated" TRUCK

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Lighting Plants from 350 watts to 25 KW., generate standard 60 cycle A.C. current, same as the High Line. A.C. Generators from 300 W. to 300 Kilowatts. Speeds of 720, 900, 1200 & 1800 RPM. Rotary Converters, single phase & three phase A.C. Motors. Write today or see your auto parts Jobber or Equipment dealer.



KATO ENGINEERING COMPANY
118 Maxfield Avenue
Mankato
Minnesota
U.S.A.

age bin adjoining the plant tower. From there the fly ash was added to the aggregate.

The different-size aggregates employed in the two courses of plant-mix were graded as follows:

Sieve Size	Per Cent Passing	
	9A Stone	25A Stone
1 1/4-inch	100	....
3/4-inch	45-65	....
3/8-inch	....	100
3/16-inch	....	90-100
No. 4	0-25	....
No. 10	0-10	0-25
	....	0-10
	Sand	....
Passing No. 4	100	per cent
Passing No. 10	0-5	per cent
Passing No. 20	5-35	per cent
Passing No. 40	30-60	per cent
Passing No. 80	15-35	per cent
Passing No. 200	0-5	per cent



C. & E. M. Photo

Two Buffalo-Springfield tandem rollers on the Cooke Contracting Co.'s resurfacing job—a 12 ton followed by a 10-ton.

At the plant a Caterpillar D4 tractor with dozer worked over the aggregate stockpiles to aerate them and give the moisture a chance to dry out. The dozer also fed the material to a Bucyrus-Erie crane equipped with a 55-foot boom and an Owen 1 1/4-yard clamshell bucket for charging the 60-ton receiving hopper at the plant. In loading with sand, the crane operator picked up one bucketful of coarse sand from its stockpile for every three bucketfuls of local sand from the other stockpile. In this manner a blend meeting the grading requirements was obtained.

Asphalt Plant

The Hetherington-Berner asphalt plant was set up at its present site four years ago by the Cooke Contracting Co. and has been used consistently during that period. Originally it was a 1,500-pound batch plant, but it has been increased to a 2,500-pound pugmill. Future plans are expected to enlarge it still further to a 3,000-pound batch plant. Water for plant operations is obtained from city mains, and electric power to run it is furnished by the Detroit Edison Co. The largest individual motors are 100-hp for driving the hot elevator and the pugmill; a 75-hp for operating the cold elevator and dryer; a 15-hp motor on the exhaust fan.

From the receiving hopper on the plant a dual feeder moves the aggregate along to a 14-foot cold elevator which discharges the material into a 60-inch-diameter x 32-foot-long dryer which is heated by two Hopkins burners. A 36-inch exhaust fan removes the dust and fumes, with the fines going to a dust collector where they are passed along to the bottom of the hot elevator. The fines and heated aggregate are raised in this 45-foot hot elevator to a triple-deck screen measuring 36 x 80 inches. The screened aggregate is collected in three bins, two for the coarse and one for the fine aggregate, each holding about 7 tons.

Asphalt cement, 60-70 penetration, came by rail in tank cars from the Lion Oil Co. at El Dorado, Ark., to the C&O siding at the plant. A steam-driven

asphalt pump unloaded the bitumen into two horizontal storage tanks holding 20,000 gallons each, or pumped it directly to the mixer. Steam-jacketed

lines, either 3 or 4 inches in diameter, carried the asphalt. Steam for plant operation, as well as heating the tank cars and storage tanks, was furnished

by a Kewanee 50-hp horizontal locomotive-type boiler; a single oil burner sufficed in its operation. Fuel oil was supplied by tank truck from the Leonard Refining Co. of Alma, Mich., and stored in a 10,000-gallon tank.

The Mix

Materials were weighed out on Kron dial scales and the aggregates were mixed dry for 10 seconds before the bitumen was admitted to the pugmill. Each batch was then mixed an additional 50 seconds. The weights of typical 2,500-pound batches of binder and top-course material were as follows:

	Binder		Top	
	Pounds	Per Cent	Pounds	Per Cent
9A stone	1,800	72.0	....	....
25A stone	....	....	1,375.0	55.0
Sand	587	23.5	887.5	35.5
Fly ash	....	....	100.0	4.0
Asphaltic cement	113	4.5	137.5	5.5
	2,500	100.0	2,500.0	100.0

(Concluded on next page)

4 Jobs — 4 Separate Locations — 56 Miles of Travel



Here the Hydrocrane is digging a tank pit for a home oil-heating unit.

"With my truck-mounted H-3 Hydrocrane hitting 40 m.p.h. on the highway, I can handle more jobs than I ever thought possible," says E. R. Wolcott, excavating contractor of Big Flats, New York. "This rig is tops for portability and quick set-up."

HERE'S WHAT THE HYDROCRANE DID IN A SINGLE DAY

"I drove 5 miles west of Big Flats and unloaded 4 tanks from railroad cars. Then, I drove 3 miles farther and set an upright boiler in place. The next job—the erection of a small quantity of Dox Blocks roof planking—was 18 miles away. Here, I had to work near high tension wires and the Hydrocrane's precision control and telescoping boom were big safety factors. My last job, which required 10 more miles of travel, consisted of digging out some old gasoline tanks. The return trip to Big Flats was about 20 miles — total travel 56 miles — all in a day. I figure we saved about 50

man hours and about \$150 on these jobs by using the Hydrocrane."

On small jobs, Mr. Wolcott estimates savings in set-up and travel time of from 60 to 75% compared to other equipment. His jobs range from setting airplane hangar doors to close quarter excavation on a hospital addition.

Two Hydrocrane sizes — 1/4 yard 2-ton and 3/8 yard 3-ton. Available with clamshell bucket, magnet, snow bucket, catch basin bucket, 3-tine and multi-tine grapple. Get the full story. Send the coupon today.

BUCYRUS-ERIE HYDROCRANE DIVISION South Milwaukee, Wisconsin

Gentlemen: Tell me how the Hydrocrane can speed up my jobs.

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Company.....

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WON'T QUIT or cause time out



A Hayward Bucket keeps the job going ahead on scheduled time. It won't quit or cause time out.

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New York, N.Y.

Hayward Buckets



SOUTH MILWAUKEE, WISCONSIN

Old Concrete Gets Plant-Mix Refresher

(Continued from preceding page)

Trucks hauling the plant-mix drove under the tower to pick up their loads which were weighed on a Winslow beam scale as they left the yard. The hauling was sublet to Matthew Trunzali of Detroit who put into service a fleet of 17 trucks that held five 1 1/4-ton batches, or a total load of 6 1/4 tons. The haul was 20 miles on the average, and took from 1 1/2 to 1 3/4 hours for a round trip. Even in the summer the mix in the trucks was covered with tarpaulins, and the binder was delivered to the job at an average temperature of 330 degrees F, while the wearing or top course was a little warmer, usually between 345 and 350 degrees F.

Before the binder course was laid on the concrete the old surface was given a bond coat of AE-2 asphalt, applied with a South Bend bituminous distributor, 1,100-gallon capacity, mounted

on an International truck. The bitumen was put on at an 80-degree F temperature.

Then the binder course was laid by an Adnun Black Top Paver and compacted by two Buffalo-Springfield rollers—first a 12-ton tandem and then a 10-ton tandem. The original concrete pavement had been put down in four 10-foot lanes, so in order to lap these longitudinal joints the binder was laid in four lanes of 11, 10, 10, and 9 feet going from sidewalk curb to median strip. The top or wearing course was similarly paved only in four 10-foot lanes.

Production averaged 55 to 60 tons an hour at the plant for the binder material, and slightly less for the top course. In a 10-hour work day the single paver laid from 3/4 to one mile of single-lane bituminous concrete.

Quantities and Personnel

Three major items were involved in this Michigan bituminous resurfacing project:

Bituminous-concrete, wearing course	7,344 tons
Bituminous-concrete, binder course	10,713 tons
Bituminous bond coat, AE-2 asphalt	18,365 gals.

The Cooke Contracting Co. employed a force of ten men at the asphalt plant, and about a dozen on the road work including flag men. Contractor personnel included Harold Thompson, Superintendent; Edward Smazel, Assistant Superintendent; and Pat Milliron, Plant Superintendent.

For the Michigan State Highway Department, Bob Martin was Project Engineer, and C. H. Brown was Metropolitan Engineer for the Department with headquarters in Detroit.

Charles M. Ziegler is State Highway Commissioner, and H. C. Coons is Deputy Commissioner-Chief Engineer.

Movable-Span Bridges

Copies of a 63-page cloth-bound book entitled "Anti-Friction Bearing Design for Movable-Span Bridges" are available to bridge engineers who request them on company or official stationery,

from The Torrington Co., Bantam Bearings Division, South Bend 21, Ind.

The book, fully illustrated, is devoted to vertical-lift, bascule, and other types of movable bridges. It shows designs of each, indicates their features, and includes a general discussion of the use of antifriction bearings in movable-span bridges.

New Device Prepares Edge on Steel Plate

A new plate-edge preparation device, designed as an aid to steel fabrication, has been announced by Air Reduction Sales Co., A Division of Air Reduction Co., Inc., 60 E. 42nd St., New York 17, N. Y. Employing a spring-balanced free-floating carriage and castor-wheel assembly, to permit bevel cutting over plate undulations while maintaining a constant tip-to-work distance, the new unit may be mounted on any gas-cutting machine equipped with a 3-inch-square torch bar.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 618.

Varied Machinery Line

All types of machinery made by Nordberg Mfg. Co., Milwaukee 7, Wis. are described in a new 28-page 2-color bulletin.

Fully illustrated with installation and product photographs, Bulletin 18 gives design data on Nordberg 2 and 4-cycle stationary and marine diesel engines, gasoline marine engines, Symons cone crushers and screens, mixers, hoists, air and gas compressors, and railway-track-maintenance equipment. The booklet also tells something about the historical background of Nordberg Mfg. Co. and describes its manufacturing facilities in Milwaukee and St. Louis.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 621.

B&D Buys Elbow Room

Some 180 acres at Hampstead, Md. have been bought by The Black & Decker Co.—Towson, Md., manufacturer of portable electric tools—as the site for a new branch manufacturing plant. Ground breaking is expected to start next month or in May.

WANT Data on LABOR FORM ERECTION ?

Recent labor data available on

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MORE FOOTAGE PER SHIFT

G-200R Wagon Drills speed production

Designed for drilling on any location—at any angle—CP WAGON DRILLS, eliminating operator fatigue, frequently double the footage over hand-held methods.

Providing fast and easy operation of the more powerful CP Drifter Drills (3 1/2-inch and 4-inch cylinder bore), the medium weight G-200R WAGON DRILL easily drills holes up to 30 feet, vertically, horizontally, or at any angle. The flexible mounting makes it quickly adjustable for toe-hole drilling or bench drilling; its wheels swivel for line drilling or drilling close to face.

A sliding cone, with a 36-inch adjustment, offsets ground irregularities and uneven steel lengths. The CP rotary air motor gives a steady feed and quick return, with plenty of power for pulling tight steel. Write for a copy of SP-1980 for full details.

The lightweight G-150 WAGON DRILL—equally as versatile as the G-200R—is designed for use with the CP 59-pound Sinker or 3-inch Drifter. It drills to depth of 20 feet or more depending upon conditions. Write for a copy of SP-3010 for complete description.



G-150 Wagon Drill



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ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

Avoid Legal Pitfalls

Edited by A. L. H. STREET, Attorney-at-Law

These brief abstracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

Workmen's Compensation Allowed in Two States

THE PROBLEM: A Minnesotan employed by a Minnesota contractor was injured on a North Dakota job and received an award under the North Dakota compensation law. He could have secured a larger award in Minnesota by applying for compensation there instead of in North Dakota. Did he have a right to apply in Minnesota for an award equaling the difference between what he got in North Dakota and what he could have gotten in Minnesota?

THE ANSWER: Yes. (Cook v. Minneapolis Bridge Construction Co., 43 N. W. 2d 792, decided by the Minnesota Supreme Court.)

The Minnesota court's opinion shows that a different conclusion was reached by the United States Supreme Court by a five-to-four vote in a similar case, involving the effect of the Texas compensation law. There it was decided that a Louisiana employee working on a Texas job could have chosen to claim under the Louisiana law; but having chosen to claim in Texas he exhausted his right to an award. (320 U. S. 430, 88 L. Ed. 149.) In a later case (330 U. S. 622, 91 L. Ed. 1140) an Illinois employee of an Illinois company was injured in Wisconsin, and received an award in Illinois. He was upheld in claiming additional compensation under the more favorable Wisconsin law, on the theory that the Illinois law, unlike that of Texas, did not make the original award final.

The Minnesota court also notes that the general rule on this subject as crystallized by the American Law Institute is as follows: "Award already had under the workmen's compensation act of another state will not bar a proceeding under an applicable act, unless the act where the award was made was designed to preclude the recovery of an award under any other act, but the amount paid on a prior award in another state will be credited on the second award."

Statute, Not Custom, Rules In Truck Collision on Job

THE PROBLEM: Two trucks hauling materials on a road job—one loaded and one empty—collided head-on on a public highway. Could the driver of the loaded truck avoid liability for driving on the left side of the road by showing an alleged custom or agreement between truck drivers that a loaded truck should have a right-of-way over a smooth lane in disregard of a general statute requiring traffic to move to the right?

THE ANSWER: No. (Stephens v. Cutsforth, 40 N. W. 2d 389, decided by the Wisconsin Supreme Court.)

The court applied the fundamental rule of law that no custom or agreement can supersede a statutory requirement.

Should Know Bond Statutes

THE PROBLEM: Defendant submitted a bid on a sanitation-district sewer job, with a bond in a sum equal to 10 per cent of the amount of the bid, binding defendant to enter into a contract if awarded the job. The notice called attention to the statutes under which the district was acting in providing for the improvement. Was the defendant bound to know that there was a related statute under which the amount of the bond would be forfeited and paid into the district's general fund if defendant

refused to enter into a contract on acceptance of its bid?

THE ANSWER: Yes. (Inyokern Sanitation Dist. v. Haddock-Engineers, Ltd., 215 Pac. 2d 792, decided by the California District Court of Appeal.)

Gravel Truck Injures Kids

THE PROBLEM: While a street abutting upon a public playground was being oiled and sanded, a 5-year-old boy darted across and was struck by defendant's heavily loaded gravel truck. There was some congestion in the area, due to movements of a sanding truck and roller. Could the driver and the owner of the gravel

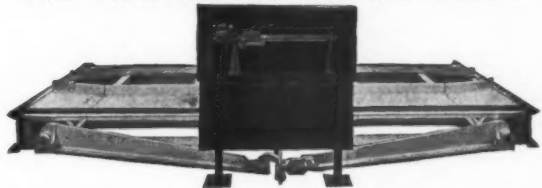
truck be held liable in damages?

THE ANSWER: Yes, if it appeared from the evidence that the driver did not take into consideration the risk of

children being in the street. (Audette v. Lindahl, 42 N. W. 2d 717, decided by the Minnesota Supreme Court.)

(Continued on next page)

WINSLOW—PORTABLE TRUCK SCALE "THE CONTRACTORS' SPECIAL SCALE"

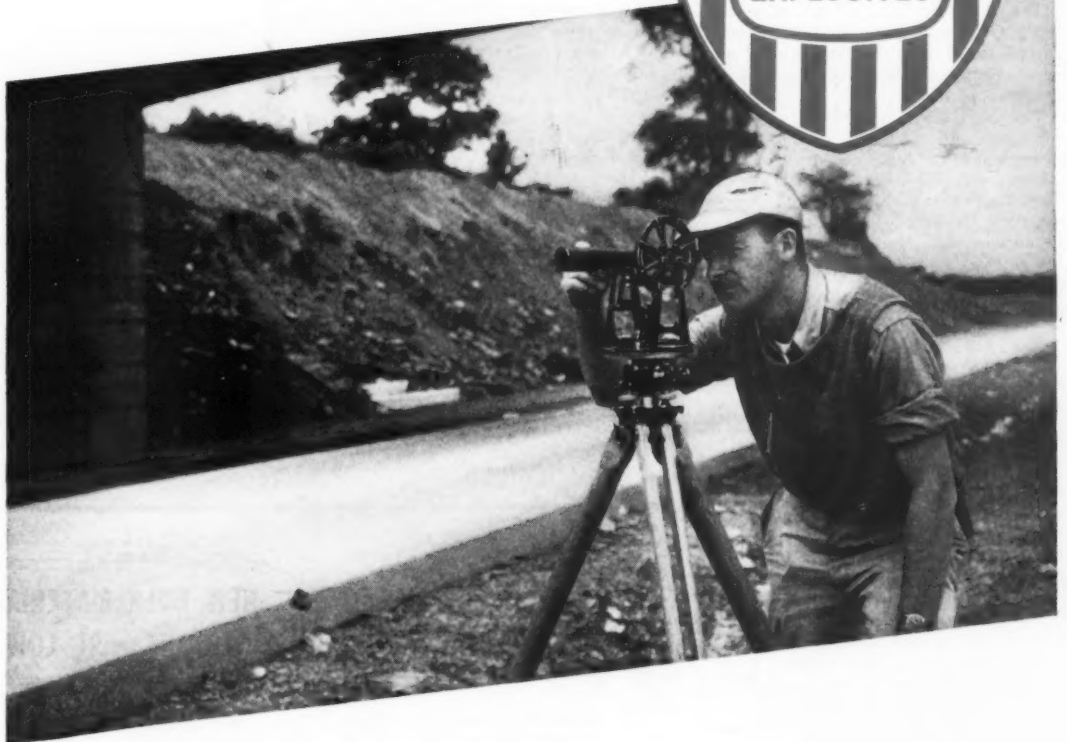


For use at temporary and permanent locations—at stock piles and by bituminous material contractors at the job site.
Capacities: 15-18-20-30 Ton—Write us for your nearest distributor

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A GOOD SHOT EVERY TIME WITH AMERICAN EXPLOSIVES



AMERICAN Explosives—because of their proved reliability—are now at work moving earth and rock on the new extension of the Pennsylvania Turnpike, which is being lengthened eastward to the outskirts of Philadelphia, westward to the Ohio border.

On this and similar jobs, you can be sure of the best results every time because every shot fired with AMERICAN Explosives is backed by years of careful research, unremitting laboratory control and modern methods of production.

Available from strategically located plants and distributing magazines, AMERICAN Explosives come in a wide variety of strengths, velocities, and densities for your convenience... remember, make your next order AMERICAN.

Capable Field Engineers are Available at Your Call

- ★ High Explosives
- ★ Permissibles
- ★ Blasting Powder
- ★ Blasting Accessories



Sales Offices: Pittsburgh, Pa. • Bluefield, W. Va. • Scranton, Pa. • Chicago, Ill. • Pottsville, Pa. • Maynard, Mass.

Avoid Legal Pitfalls

(Continued from preceding page)

When contractors are involved in accident to playing children, it is usually where the children have been injured on or about unattended and unguarded machinery left in a road or street outside working hours. However, the Minnesota court put road operations in the same category, saying: "Road-repair machinery and operations of this kind are attractive to young children, and their presence is reasonably to be anticipated. . . . Motorists must anticipate the increased hazard by using a correspondingly high degree of care."

Determining Low Bids Under Alternate Spex

THE PROBLEM: A state highway project required removal of buildings from the site. Bidding spex gave the State right to choose one of three methods of riddance, and required bidders to bid a lump-sum price for riddance according to whichever of two methods the State should choose. As between two bidders, was the bidder of a higher gross sum on the entire job entitled to upset an award to the lower bidder because the State's exercise of reserved choice might result in the higher gross bid being more advantageous to the State than the lower one?

THE ANSWER: No. (Application of A. E. Ottaviano, Inc., 98 N. Y. Supp. 2d 606, decided by the New York Supreme Court, Appellate Division, Third Department.)

The court said that under New York Highway Law, Sec. 38, Subd. 3, "the gross bid which becomes decisive includes each bid item even though it may later eventuate that such items may not be called into performance" because of the reservations provided for.

Matter of Bid-Bond Liability

THE PROBLEM: A contractor was low bidder on a city sewer job, but refused to contract, claiming that the cost of wyes aggregating \$55,448.06 had been inadvertently overlooked in figuring the bid. He sued to prevent forfeiture of a \$37,500 bid bond binding him to take the contract if awarded to him, on condition that if he failed to do so, the "surety's liability to the city will be established". In the absence of any applicable statute authorizing forfeiture of the bond regardless of actual loss to the city, was the bidder liable beyond the amount of such loss?

THE ANSWER: No. (Petrovich v. City of Arcadia, 222 Pac. 2d 231, decided by the California Supreme Court.)

The decision is chiefly important as judicial authority for the proposition that unless a bid bond itself provides for forfeiture regardless of loss to the municipality, or unless there is a statutory or charter requirement of forfeiture, the bond is to be deemed to intend to cover only such actual loss—not exceeding the amount of the bond—as may result to the municipality because of a breach. It is also to be noted that since this case arose, the California legislature has enacted—in 1949—a law that does require a forfeiture of the full amount of the bond, as applied to cities of the class—sixth—to which defendant city belongs.

Two of the seven justices who heard the case dissented, being of the opinion that the bond was so worded as to show intent on the part of the city to use its admitted power to require a bond subject to forfeiture regardless of actual loss.

Both the majority and minority opin-

ions are noteworthy because they cite numerous decisions on the subject of bid-bond forfeiture rendered by the appellate courts of California and other states. Cited cases where bonds have been so worded as to call for forfeiture arose in Nebraska, New York, Illinois, Massachusetts, Maryland, and North Carolina.

In one specially interesting case—Town of Mill Valley v. Massachusetts Bonding, etc., Co., 68 Cal. App. 372, 229 Pac. 891—the California District Court of Appeal interpreted a statute which required bids to be accompanied by a check or bond and provided that if the successful bidder refused to contract, the check should be forfeited. As to cases where bond should be given, it was merely provided that "any bond forfeited may be prosecuted and the amount due thereon collected", but there was no declaration in the statute that a defaulted bond should be forfeited. The court decided that the full amount of a bond could be declared forfeited.

Blasting Contractor's Liability for Damages

THE PROBLEM: Ordinarily one suing for injury to his property must not only prove the injury but show that it resulted from some distinct cause for which defendant was at fault. But in exceptional cases negligence may be presumed. Plaintiffs, home-owners, engaged defendant to blast rock for a cellar in their absence. When they returned they found that the house was seriously damaged. Was the contractor bound to show he was not at fault?

THE ANSWER: Yes. (Philpot v. Rhine-smith, 71 Atl. 2d 219, decided by the New Jersey Superior Court, Appellate Division.) The court said that because the blasting was under the contractor's control and, presumably, that injury to the house would not have happened had the blasting been done carefully, it was up to him to show it was not his fault or that of his employees.

But a decision in the case was somewhat simplified by proof that the contractor had explained to plaintiffs that "a little accident" had happened, that his employee "must have drilled too deep and put in too heavy a charge to crack the walls like that", and that he, the contractor, would "take care of the damage".

Water Commissioners Reject Lowest Bid on Waterworks

THE PROBLEM: Under a statute requiring municipal contracts for public works to be let to the "lowest and best bidder", did water commissioners violate the statute by rejecting the low-

est bid to construct waterworks and awarding the contract to a higher bidder on the ground that the lowest bidder was not qualified to do the work?

THE ANSWER: No. (Fetters v. Mayor and Council of Wilmington, 74 Atl. 2d 470, decided by the Delaware Court of

(Concluded on next page)

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Avoid Legal Pitfalls

(Continued from preceding page)

Chancery.)

The court decided that the commissioners could not legally reject the lowest bid of one "reasonably qualified to do the work merely because they believe a higher bidder is even more qualified". But the words of the statute, "and best", would be meaningless if it were required that a job be awarded to the lowest bidder.

Although the court thought that investigation of the lowest bidder might have been "more thorough", it concluded that there was a substantial basis for the commissioners' conclusion that "the lowest bidder was not reasonably qualified to do the proposed work through lack of an organization of the size and experience of the type necessary for such work."

Steel Delivery Was Delayed; Right to Damages Not Waived

THE PROBLEM: A seller of structural steel was delinquent in delivery. The buying contractor notified the seller that he would be held liable in damages if delivery were not made within ten days. Delivery was made within that time. Did the contractor thereby waive the right to hold the seller liable in damages for the delay?

THE ANSWER: No. (Robberson Steel Co. v. Harrell, 177 Fed. 2d 12, decided by the United States Court of Appeals, Tenth Circuit.)

The court said that the notice given by the contractor could not be regarded as an agreement on his part to accept the belated delivery as a complete substitute for the earlier delivery required by the original contract, because there was no legal consideration to support such modification of the contract. All that the contractor waived was his right to terminate the contract because of the delay in delivery.

Highway Director's Power To Employ Engineering Aid

THE PROBLEM: An Ohio statute empowers the state Director of Highways to "employ such assistants as are necessary to prepare plans and surveys" for highway improvement and construction and to employ other necessary engineers. Could the Director bind the State by employing an engineering firm, delegated by him to make surveys, plans, and specs, for a percentage fee based upon the cost of a proposed improvement?

THE ANSWER: No. (State ex rel Alden E. Stilson & Associates, Ltd., v. Ferguson, 93 N. E. 2d 688, decided by the Ohio Supreme Court.)

The contract required the firm to "do all field survey and record-search work" needed to prepare complete plans, etc., and to prepare plans, designs, etc. Only registered engineers, architects, and surveyors were to be used. The firm agreed to indemnify the State from all losses caused by it

or its agents and employees.

The firm billed the State for preliminary services. The State Department of Highways approved the bill, but the State Auditor refused to issue a warrant and the firm unsuccessfully sued to compel him to do so.

The Supreme Court rested its decision largely on the ground that the contract virtually substituted the firm's agents and employees for the assistant of the Director, and reduced his function in the planning of projects to mere approval of surveys and proposals submitted by the firm. "Such a situation is not consistent with the statutory provisions authorizing an officer to employ assistants and requiring such officers to be responsible for the performance of their duties under the penalty of a bond." The provision that the firm would hold the State harmless for loss caused by it was "not a reasonable substitute for the responsibility imposed by law on the Director of Highways to prepare plans and surveys for highway improvements."

Taxation of Equipment

THE PROBLEM: A road contractor's headquarters were in C County, but equipment was moved from county to county in the state as needed on jobs. (1) Was equipment found in Y County taxable there under a statute authorizing taxation of "transient property used in business or commerce"? (2) Could the contractor defeat Y County's

claim for taxes because taxes, improperly levied by C County on the same equipment, were paid?

THE ANSWERS: (1) Yes. (2) No. (Packard Contracting Co. v. Roberts, 222 Pac. 2d 791, decided by the Arizona Supreme Court.)

The court said that no unconstitutional "double taxation" is involved in the levy of an invalid tax and a valid tax on the same property.

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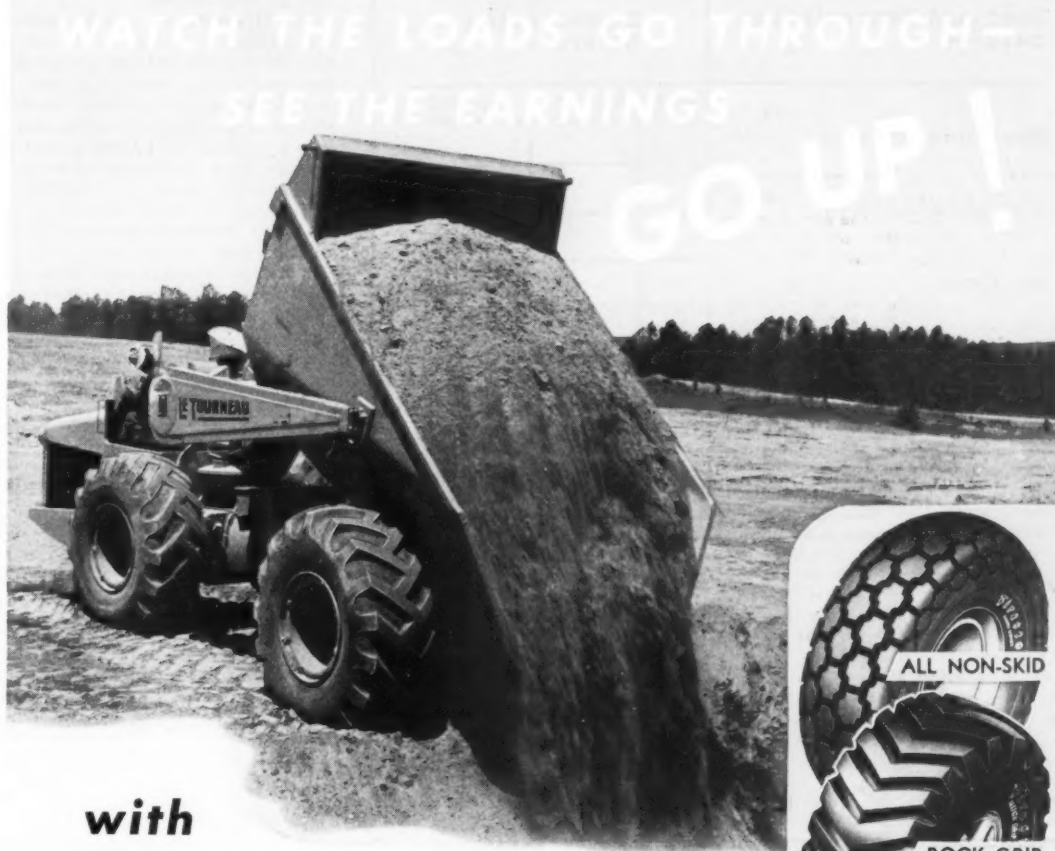
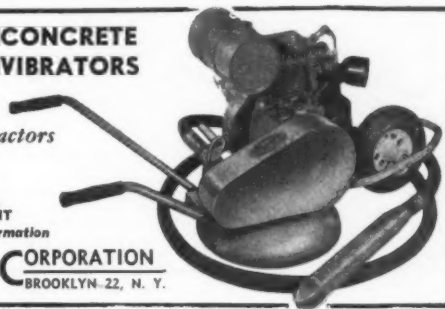
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PAY PERIOD ENDING _____

NAME AND S. S. NUMBER	GROSS WAGE	WITH'ING. TAX	FEDERAL S. S.	STATE S. S. DEDUCTED	STATE S.S. WE PAY	OTHER ITEMS	NET WAGE

Form 1: The wage form is set up to act as the pay sheet for all a contractor's employees for a given pay day.

Bookkeeping Need Not Be A Chore

Five Simple Forms Furnish Details About Wages, Equipment, Materials, Cash, and Credit: Basis of Summary Ledger

Part II

By DAVID MARKSTEIN

Name of Asset _____

Date purchased _____

Cost and Depreciation rate---

Depreciation Record--

Purchase price--

\$ _____

Installation--

\$ _____

Freight--

\$ _____

Estimated trade-in value--

\$ _____

Estimated life--

Year Amount Balance

Form 2: The depreciation record tells the real worth of each piece of equipment.

• IN many cases, the contractor's summary ledger—explained in last month's article in this series about simplified bookkeeping—furnishes all of the detail needed. But often, greater detail is required, and the figures on the summary ledger are "summaries" of facts gathered on other records.

When it comes to wages, for example, the contractor is required by law to maintain records which show more than the mere amount paid to a man. He must keep records of Social Security, of employer's Social Security, and of state payroll tax for unemployment insurance. In a few states where both employer and employee contribute to the employee's old-age income, a record of the employee's own contribution must be kept. In some cases, contractors arrange to deduct other items from pay, such as Red Cross and other charity contributions, or Government bond deductions. They require records too—records more complex than can be easily kept on a summary sheet.

Wage Form

The wage form illustrated (Form 1) tells all of the needed facts at a single glance. It is set up to act as the pay sheet for all employees for a given pay day. The date is entered at the top, the

employees' names and Social Security numbers are entered in the first column. Then after each employee's name is noted his gross wage, the amount of income tax withheld (withholding tax), the Federal Social Security which has been deducted, the state Social Security deduction (if any), the amount of payroll tax put up by the contractor for the employee, and "other" deductions which consist of extras along the line of spaced-out contributions or payroll-plan bond deductions. The final column indicates the "net" wage. This is the employee's take-home pay, the amount that actually reaches his hands.

Equipment Depreciation

The summary ledger has columns for indicating the worth of equipment owned by the contractor. But how is he to tell the worth? It is not the purchase price, for the piece "depreciates" from year to year—furthermore, there are such items as freight and setup costs which properly belong in the cost of the item.

The form illustrated for a depreciation record (Form 2) furnishes the facts needed to summarize the worth of a contractor's capital-investment equipment. At the top, the name or stock number of the item is entered, along with the date it was acquired. On the next line goes the depreciation rate. If the piece of equipment is expected to last for five years, the depreciation rate is 20 per cent—that's how much the item goes down in value every year.

In the columns at the left of this form, the contractor enters purchase price, freight paid, and installation or original setup cost. These add together to give the real cost of the equipment. Then he notes the estimated trade-in value when obsolescence has set in, and the estimated life of the equipment. In the columns at the right are recorded dates (years), the amount of depreciation each year (20 per cent of the total cost less trade-in value), and the balance.

Perpetual Inventory

What about supplies and materials? (Concluded on next page)

ITEM

Sold by _____

Stock no. _____

Maximum _____

Minimum _____

Mark-up _____

No. Purchased	No. Drawn out	Total on Hand	Cost	Unit Cost	Ext. Cost	Selling Price

Form 3: A perpetual-inventory record tells exactly what supplies and materials are on hand at each job headquarters at all times.

CASH VOUCHER

Amount -- \$ _____

Date --- _____

To buy --- _____

Charge to acc't. _____

Okayed by --- _____

Form 4: Cash vouchers work with petty-cash

CREDIT LEDGER

Name _____

Date	Billed for	Total	2nd Statement sent	Overdue

Form 5: The credit ledger, for each account, flashes a warning to permit no more credit when accounts are overdue.

To know how much each department and job headquarters has on hand, many contractors maintain modern perpetual inventory systems, such as the form (No. 3) illustrated.

On it is space for a description of the item, the name of the vendor, and the stock number. If it is something which will be later billed out at a marked-up price, then the mark-up should be indicated in the box at the right, along with minimum and maximum quantities to be kept on hand. The minimum will be the barest number which can carry operations through until a re-order can be secured. Whenever entries below indicate that withdrawals from stock have brought quantities to the minimum, a re-order should be sent out. The maximum is a quantity that good business sense dictates is more than enough.

In the first columns go the date of purchase or withdrawal and the quantity. The total now on hand is noted in column three—it will be the last total, less the number taken out in the case of a withdrawal, or plus the number purchased. The cost will go into the following column, with unit cost in the next space. The extended cost goes into the next-to-last column. This is the average cost of all stock, both old and new. It is important to know this extended cost in a time of frequent price changes such as we have today. Finally—if the item is one which will be resold at a higher price—the new selling cost is entered in the last space. This is arrived at by adding the mark-up to the new extended cost.

Cash Voucher

Control of cash and credit are two bookkeeping tasks which cannot be handled on the summary sheet alone. The illustrated cash-voucher form (No. 4) is a simple one. It works in conjunction with a petty-cash account. Whenever the petty cash runs low, the total of remaining cash and cash vouchers should be equal to the amount in the cash drawer when it was last re-filled.

Credit Ledger

The credit ledger illustrated (Form No. 5) is kept for each account. The date a job is billed goes into column one, the description of the work covered by the invoice in the next column. Then comes the total amount owed by this customer. If he is slow at paying and requires a second statement, the date of sending pay-up notice number 2 should be put into the following space. If he's overdue, an entry in the last column flashes a warning to permit no more credit until the delinquency has been made good.

Masonry Water-Repellent

A new 4-page catalog describing Crystal, a silicone material designed to act as a water-repellent for all masonry surfaces, has been prepared by Wur-dack Chemical Co., 4977 Fyler Ave., St.

Louis 9, Mo. It outlines the composition of the product, what it does, and how it is applied. Research-test photographs illustrate the penetration properties of Crystal and its results.

The product is said to repel water, prevent efflorescence, retard staining, and protect masonry joints. It can be applied by brush if directions are carefully followed, the company points out, but spraying gives best results.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 556.

Piles for Every Need

Four basic concrete piles are illustrated in the new 8-page folder available from MacArthur Concrete Pile Corp., 18 E. 48th St., New York 17, N. Y. Experience has shown, the literature says, that no one type of piling will provide an adequate answer for all soil conditions. The MacArthur piles include the standard, pedestal, cased, and composite types.

Text indicates conditions under which each is used and diagrams show methods of driving. On-the-job illustrations show MacArthur piles being driven on projects throughout the country. The booklet also outlines the services available from this company: soil borings, equipment, and consultations.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 606.

County Road Man Moves Up

J. T. Sabel, former McCracken County, Ky., road engineer, is now Assistant Director of Maintenance for the Kentucky Highway Department, with responsibility for the more than 3,000 bridges and drainage structures throughout the state. He served the Highway Department also between 1940 and 1948.

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U. S. Exports Highway Know-How Through BPR

Bureau Supplies Literature, Offers Study Courses and Technical Aid, And Takes Part in Conferences

• FOR many years the Bureau of Public Roads has been in the export business—its goods, this country's highway know-how; its profits, international good will and progress. At a recent staff conference of the Department of Commerce, Commissioner Thomas H. MacDonald reviewed and assessed these export activities.

He mentioned first the bimonthly magazine *Public Roads* which reports the studies and research of the BPR. Almost every country and colony in the world used to receive the magazine, he said. Now, with mailing to Russian-dominated areas discontinued, 54 countries and colonies receive it. Distribution is free to principal highway agencies, large libraries, and technical schools.

Technical Study Courses

For over 25 years the BPR has been helping highway engineers from other countries to study this country's road practices. By the middle of 1948 it became apparent that more and more foreign visitors were on their way, and to avoid repeating its courses for each group as it arrived, the BPR proposed to the Department of State that a course on highway practice be given each year, and that other governments be invited to send their engineers over here at that time. The Department of State endorsed the proposal and in September of 1948 announced a 17-week course to be held between May 16 and September 9, 1949.

Seventeen countries sent 52 delegates to the course. Lectures and discussion periods took up the first six weeks. Then came two weeks of touring equipment-manufacturing plants; eight weeks of field observation; and a final week of review and summing-up.

A second course similar to the first was offered last year, starting May 16 and ending September 1. Fifty-five delegates attended. The first two weeks were given over to discussion and orientation; the next three to a construction and maintenance field trip; the next ten to specialized studies and group field trips; with a final closing week.

Over 50 engineers of Public Roads participated in the 91 lectures given, but the work of running the course required the full-time service of only the Director and a small staff. The delegates were grouped in threes and fours for the field trips. During the specialized-study period they attended only those classes in which they were specially interested, spending the rest of their time reading, discussing, and writing reports. A library and reading room set aside for them contained all the references given for the subjects covered in the course. Public Roads expects to conduct a third such course this year.

The Bureau is also working with the Economic Cooperation Administration in arranging training for groups from Turkey, France, and Sweden for periods of from four weeks to a full year.

Mr. MacDonald pointed out that these study courses promote not only technical progress but international understanding, since delegates live and work together with Americans while they are here.

International Conferences

In addition to supplying literature and conducting study courses, the BPR

has long taken part in international conferences such as the French-organized Permanent International Association of Road Congresses. Since the war the U. S. government has not acted to continue membership in that organization since its work parallels functions of the United Nations. The Bureau is, of course, called upon to participate in any U. N. activity relating to highways and motor transport. Two of its engineers were included in the U. S. delegation to a recent United Nations meeting on motor transport in Geneva, Switzerland.

Its members have also represented the U. S. at the series of Pan American Highway Conferences which have been held ever since 1923—the fifth to take place this year in Lima, Peru. In 1929

and 1930 it attended special conferences in Panama at which representation was confined to the U. S., Mexico, and Central American countries. The purpose of these conferences was to promote the Inter-American Highway, the section of the Pan American Highway System lying between the United States and the Panama Canal.

Foreign Road Construction

The Bureau's fourth kind of contribution to international road affairs is its technical aid to highway construction in foreign countries.

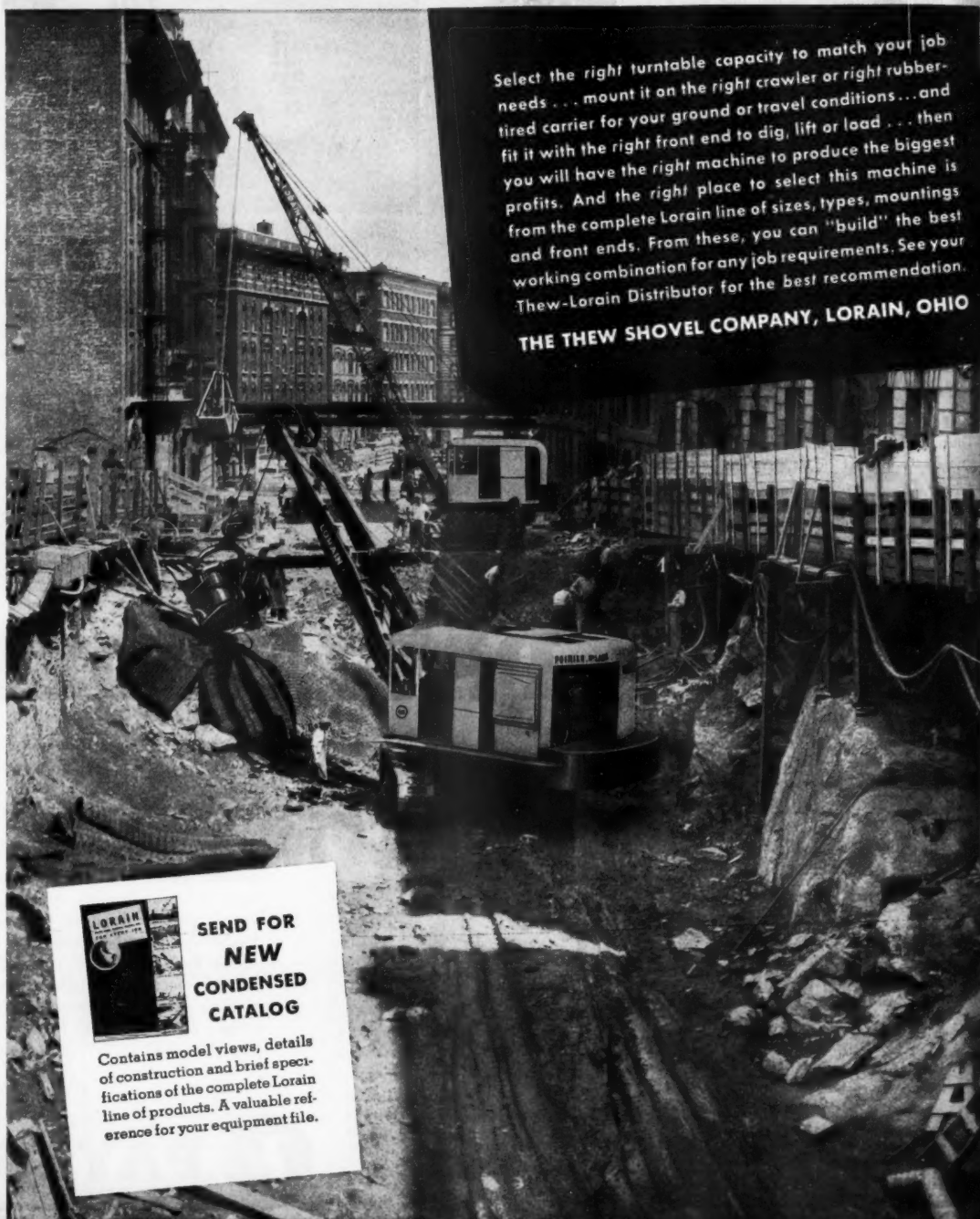
Through its Inter-American Regional Office and field offices in Central America it has supplied a technical guiding hand in the construction of the Inter-American Highway, for which a

total of \$33,100,000 has been authorized by Congress. Its work has included surveying, preparing plans, supervising construction, solving supply problems, and training native crews to do the work. U. S. assistance to Central American countries is already paying dividends, said Mr. MacDonald. As trucks and busses replace the backs of men and mules, rich lands are opened up for cultivation, food supplies increase, and trade between America and Central America flourishes.

Public Roads has supervised the spending of \$4,000,000 on the Rama Road in Nicaragua. During the war it supervised construction of the Alaska Highway with funds supplied by the War Department. Two of its engineers


(Concluded on next page)

5 STEPS TO SELECTING THE *BEST* SHOVEL-CRANE



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are now in El Salvador lending a hand with a suspension bridge over the Lempa River. The Bureau is aiding Ecuador to build sections of the Pan American Highway through the rugged Andes. It is helping the State of Cundinamarca in Colombia to plan and construct a highway system, and it is helping Peru to reorganize its highway department, financing, equipment purchasing, etc.

It has turned over to Bolivia and the Export-Import Bank surveys, plans, and estimates for the 312-mile highway from Cochabamba to Santa Cruz. It is advising and instructing Turkish personnel in matters connected with the highway program which is being partly financed by a \$5,000,000 loan to that country. And by the end of this fis-

cal year, it will complete its work under the Philippine Rehabilitation Act. When it pulls out of the islands it hopes to leave behind a Philippine organization well trained to carry on the road work in that country.

Bucket Loaders Described

A 4-page folder describing the Models K-5 and K-5B bucket loaders has been prepared by N. P. Nelson Iron Works, Inc., Clifton, N. J. Model K-5 is designed to load 2 yards per minute. It is a compact, mobile unit, with straight boom and 180-degree swivel-spout discharge. The K-5B is like the K-5 but has a pivoted conveyor discharge.

The bulletin outlines construction

and operating characteristics of these units and lists all standard and special equipment. Cross-section drawings indicate dimensions and operating ranges. Complete specifications and some on-the-job photos of the loaders handling topsoil, stone, etc. are also included.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 690.

Manages Smith Welder Sales

A. G. Hendrickson has joined A. O. Smith Corp. of Milwaukee as Welding Equipment Sales Manager. The Smith welding machines range from 180 to 650-amp capacity. Hendrickson's appointment marks the company's increased emphasis on this line.

Convention Calendar

March 26-29—Purdue Road School

Thirty-Seventh Annual Purdue Road School, Purdue University, Lafayette, Ind. Prof. Ben H. Petty, School of Civil Engineering, Purdue University, Lafayette, Ind.

March 28-30—N. Y. Highway Engineers

Annual Convention, New York State Association of Highway Engineers, Rochester, N. Y. William H. Saunders, Convention Secretary, P. O. Box 72, Rochester, N. Y.

April 2-4—Highway Engrs. Conference

Annual Meeting, Utah Highway Engineering Conference, Union Bldg., University of Utah, Salt Lake City, Utah. Prof. A. Diefendorf, Head, Department of Civil Engineering, University of Utah, Salt Lake City, Utah.

April 3-5—Ohio Highway Conference

Annual Meeting, Ohio Highway Engineering Conference, Ohio State University, Columbus, Ohio. Prof. Emmett H. Karrer, Brown Hall, Ohio State University, Columbus 10, Ohio.

April 3-6—N. Y. Safety Convention

Annual Safety Convention and Exposition, Greater New York Safety Council, Statler Hotel, New York, N. Y. Paul F. Stricker, Executive Vice President, Greater New York Safety Council, 60 E. 42nd St., New York 17, N. Y.

April 4-7—Roadside Development Course

Second Annual Short Course Conference on Roadside Development, Louisiana State University and Louisiana Department of Highways, Old Peabody Hall, Baton Rouge, La. H. A. Flanakin, Associate Prof. of Civil Engineering, Louisiana State University, or T. Slack, Roadside Development Engineer, Louisiana Department of Highways, Baton Rouge, La.

April 4-7—Roadside Development

Tenth Annual Short Course on Roadside Development, Departments of State Bldg., Columbus, Ohio. Prof. Chas. R. Sutton, Landscape Architect, Brown Hall, Ohio State University, Columbus 10, Ohio, or Wilbur J. Garmhausen, Chief Landscape Architect, Department of Highways, Columbus 15, Ohio.

April 5-6—Kentucky Highway Conference

Annual Meeting, Kentucky Highway Conference, College of Engineering, University of Kentucky, Lexington, Ky. R. E. Shaver, Head, Department of Civil Engineering, University of Kentucky, Lexington, Ky.

April 9-11—Highway Short Course

Annual Meeting, South Dakota Highway Short Course, Union Building, South Dakota State College, Brookings, S. Dak. Emory E. Johnson, Professor of Civil Engineering, South Dakota State College, Brookings, S. Dak.

April 24-26—Wood-Preservers' Meeting

Annual Meeting, American Wood-Preservers' Association, Stevens Hotel, Chicago, Ill. H. L. Dawson, Secretary-Treasurer, 839 17th St., N. W., Washington 6, D. C.

April 30-May 4—Materials Handling

National Materials Handling Exposition and Conference, American Materials Handling Society and Materials Handling Institute, International Amphitheatre, Chicago, Ill. Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.

May 10—Flood-Control Association

Annual Meeting, Mississippi Valley Flood Control Association, Mayflower Hotel, Washington, D. C. R. W. Crawford, Executive Vice President, 203 Peabody Hotel, Memphis 3, Tenn.

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Further information may be secured from the company. Or use the Request Card bound in at page 16. Circle No. 588.

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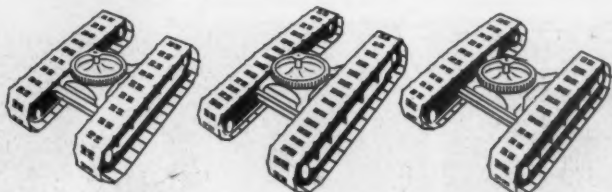
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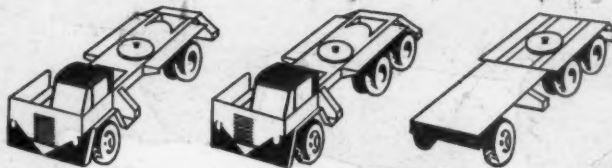
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Fort Randall Intake A Forming Nightmare

Lack of Space, Water Cure, Temperature Control, and Tough Forming Problems Cause Bad Headaches to Contractor

By **RAYMOND P. DAY**,
Western Editor

• **HERE you go.**

You've got a Corps of Engineers contract for \$11,839,517 for construction of the intake structure at Fort Randall Dam, near Pickstown, S. Dak. You want to make money.

The intake structures contain approximately 193,000 cubic yards of concrete. For control of shrinkage and to minimize cracking, the sequence of concrete placement is rigidly con-

trolled. The structure requires a total of approximately 6,700 separate pours of concrete ranging in volume from less than 10 cubic yards to over 50 cubic yards. The average volume per pour is only 28.5 cubic yards; however, 60 per cent of the total volume is placed in pours of 40 cubic yards or over.

The structures, although of massive type, are not of the mass-concrete variety. Numerous openings, slots, platforms, and machinery levels result in a structure similar to a building designed for extremely heavy loading. The ratio

of form area per cubic yard is 11.1 square feet as compared to a ratio of 40 square feet per cubic yard for an average concrete industrial type of building.

The Corps of Engineers has set up 50 to 65-degree temperature-control concrete specifications, which means that you operate the ice plant at full capacity any time the temperature outside is over 50 degrees.

Your men, half-discouraged at the God-forsaken hell hole that Sitting Bull had sense enough to leave in 1875, until the Army brought him back by force, are hard to keep. You have to keep them interested, and contribute something to their morale, because you can't build the intake works yourself.

You've got to give the concrete a continuous 14-day water cure, down in a hole where half-dissatisfied men will have to work in raincoats.

There isn't room to work.

What do you do?

It's a good question; one that the joint-venture firm of Al Johnson Co.

and Winston Brothers Co. of Minneapolis worried with longer than they care to admit. But while the job was tough, the contractors pushed ahead steadily without crying or complaining. Genial Oscar McCormick, Project Manager, who has rattled around construction work a long time and who can get along with anybody, handled the situations as they came up in his own way. Some were unique . . . but we're getting ahead of our story.

First, Consider the Job

Let's get an idea of the job first. The concrete intake works at Fort Randall Dam will pick up reservoir water from the Missouri River, train it through 8 power penstocks and 4 flood tunnels, and send it either through the powerhouse or down the outlet channel.

There are 12 towers in the intake works, 180 feet high. Each tower consists basically of three training walls and two waterways, with a transition section leading to the round tunnels. The tunnels are constructed under another contract. There are two air vents in each tower, a trash-rack slot, a stop-log slot, gate slot and guide, and two sets of gates in each waterway.

Towers 1 and 2, 3 and 4, 5 and 6, 7 and 8, 9 and 10, and 11 and 12 are tied together by joining walls after the structure is up to final elevation. There's another little delay here. The 8-foot base slab, poured in two 3-foot lifts and a 2-foot course, wasn't too bad, but that tiny joining slot containing just a dinky few yards of concrete has to reflect the same 3-3-2 lifts!

Add rubber and copper water stops, piezometer pipes, wet sandblasting of concrete joints including the vertical ones, and you have an idea of the job.

Lack of Space

The lack of space available for construction operations adjacent to the intake structure called for careful and intelligent preconstruction planning on the part of the contractor.

The intake-structure base lies at an elevation somewhat below the present riverbed to facilitate diversion of the river flow through the structure. It is located in an area excavated by others in the chalk formation in the left abutment. The extent of the excavation was the minimum necessary to permit building of the structure and to permit access to the construction area. Flow of materials to the area, types of construction equipment to be used, and maneuverability in the area all had to be carefully planned by the contractor's forces to insure a steady rate of construction and to guarantee completion of the structures within the scheduled time.

Oscar McCormick's answer was a trestle the length of the intake structure, set in chalk over the tunnels. On this trestle he put 2 American Revolver cranes, on 105-foot gantry frames, with 125-foot booms. He also put in a Washington revolving crane, same-size gantry, with a 100-foot boom.

The cranes were therefore up out of the way, but their booms could reach every part of the intake structure.

How about materials? The cranes had to bring them in, of course, but there was a refinement even on that. R. V. (Continued on next page)



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The GYRO-FLOW is driven by the powerful Series 71 General Motors diesel engine. This six-cylinder, two-cycle engine has proven its stamina and reliability on contracting equipment, buses, locomotives and ships all over the world. Your nearest Ingersoll-Rand representative will be glad to give you the full story on the new GYRO-FLOW 600.

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Evans—"Rog" to everyone who knows him—headed the contractor's engineering department. His men made takeoff lists from the plans. The result was a bill of material for all embedded metal items, piezometer pipe, de-icing equipment, plumbing, conduits, and so on. The lists were so complete that they often had to show the inspectors where things went.

The lists went out to various shops, where men made everything up and loaded it into timber skips. Everything for a pour went in one skip . . . or several if necessary. Skip and all then went out to where a revolving crane could pick it up and place it down on the spot. Presto! No pain or strain. No men chasing over each other to find an item. There it was, ready for them to install.

Oxyacetylene welding equipment on every tower, bubbling drinking fountains, small tools and supplies were moved by the cranes. Even the forms were handled in as large a section as possible, and stripped lumber ready for the bonfire went out by skip and was burned pronto. Housekeeping? Old Mother Hubbard and fifteen safety engineers never saw anything like it. They twisted the lack of space around until it was a help instead of a hindrance.

Elaborate walkways and stairways led from one tower to another, so the men could get around.

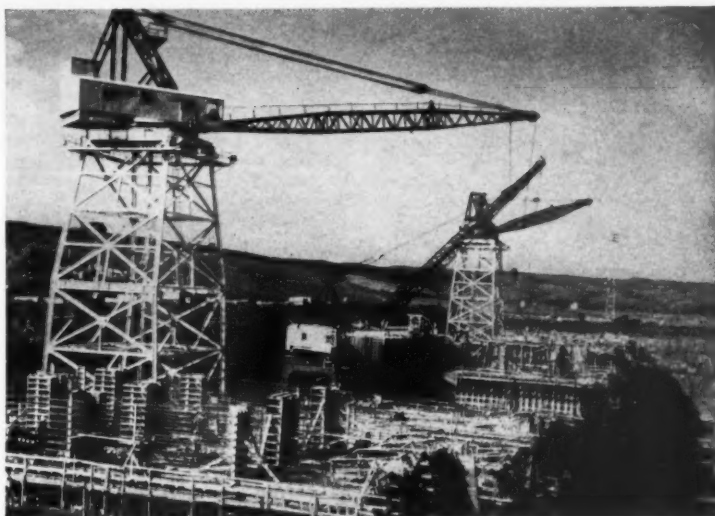
Formwork

Extensive formwork was a problem also.

Cut up into pours from 16 to 25 feet long, the towers required construction of numerous bulkhead forms. The biggest single form used was a 40-foot panel 10 feet high; however, the structure was so arranged that many repeat uses could be secured from each set of forms. Height of lift and extent of pours were rigidly specified by the Corps of Engineers to insure a minimum of cracking. The architectural treatment was adapted to accenting the basic form of the structure but had no influence on the height and arrangement of lifts. The individual pours were smaller than permitted on mass-concrete work—averaging about 50 cubic yards for the first 100,000 cubic yards and less for the remaining 92,000 cubic yards.

The complicating thing about formwork was not layout so much. It was a list of tolerances in the specifications. Example: in 20 feet the maximum variation allowed was 1/4 inch for piers, walls, and partitions. Tolerances were specifically covered, and the limits meant that forms had to be built stronger and heavier than many a carpenter had ever seen.

The forms were therefore built in prefabricated sections in a central yard, and then swung in place by a revolving crane. The carpenter force totaled over 200. In general, the forms consisted of 2-inch lagging for the face, nailed to studs often as heavy as 4 x 12. Wales



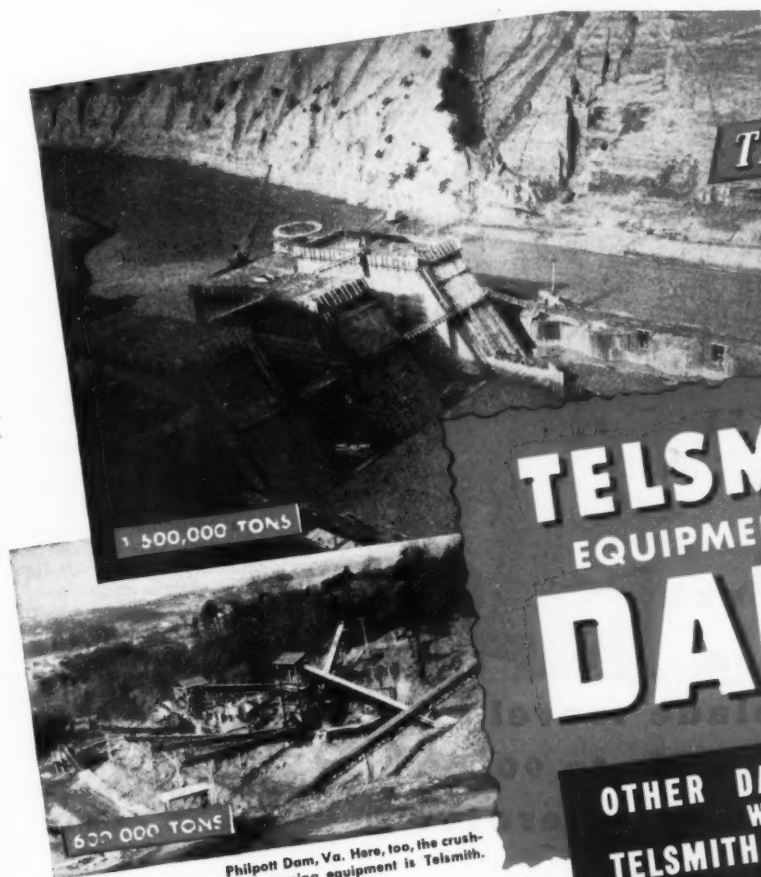
C & E. M. Photo
Revolving cranes—two Americans and a Washington—at work on the intake structure at Fort Randall Dam, near Pickstown, S. Dak.

were heavy 6-inch steel H-beams. Superior steel form ties were used through the pours, and at the same time the forms were braced externally by cable X-bracing, tightened to fiddle-string tautness by turnbuckles. Occasional steel hairpin tiedowns snugged forms like those in the pier noses into position.

The carpenter yard had an oil-dipping vat where loads of lumber could be oiled as they hung suspended by a Koehring truck crane. Small power saws, sanders, small tools, and so on were here. There were two DeWalt rip-saws, a Supreme bandsaw, and a Crescent planer.

B. O. Benson, an old hand with carpenters, ran that part of the show. He didn't have an easy job. His carpenters would work like madmen for several days and get a batch of forms set out ahead. They were pleased then. What was the matter with the concrete crew?

That night here would come Don Green and his concrete demons, and (Continued on next page)



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- Dale Hollow Dam, Tennessee
- Davis Dam, Nevada
- El Presidente Dam, Mexico
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Fort Randall Intake A Forming Nightmare

(Continued from preceding page)

they'd work until the last form was filled. There was simply no future in it for the carpenters.

Concrete-Temperature Control

Concrete-temperature control was also one of the troublesome job conditions Johnson-Winston had to whip. Here is the exact wording of the Corps of Engineers key sentence from the concrete specifications:

"The intent of this paragraph of the specifications is to insure that the concrete will be placed at all times at the coolest temperature practicable, utilizing the full capacity of the refrigeration equipment and methods necessary to avoid exceeding the 65-degree maximum during the heat of summer as long as placing temperatures exceed 50 degrees."

Since refrigeration equipment was



C. & E. M. Photo

Johnson-Winston and Corps of Engineers key people ate lunch together and talked shop. Seated from right to left are: Office Manager Gustapson, Carpenter Superintendent Benson, Area Engineer Evans, General Superintendent Grippio, Project Manager McCormick, and Night Superintendent Don Green.

specified to insure a 65-degree F maximum in the heat of summer, and also required to be operated at full capacity,

the resulting placement temperature was in the vicinity of 54 degrees for the major portion of the summer pours.

Now 50-degree concrete on a blistering South Dakota summer night isn't easy to get. Especially when the breeze dies down about 11 p. m. and two sultry, sticky hours set in.

Aggregates and sand, supplied by the Corps of Engineers, came in by railroad. A Robins car shakeout helped to unload the hopper-bottom cars. Electric-powered Barber-Greene conveyors stacked the material in a closed pile over a V-shaped chalk cut, tapped underneath by a recovery tunnel. Never a man had to work in there; it was all live storage. A conveyor took the materials up to a 400-ton Johnson automatic batching plant. Bulk cement came in by hopper-bottom cars and was stored for use in a 7,500-barrel Johnson silo.

The cooling process consisted of three things: (1) sprinkling the aggregates with cool water, (2) use of near-freezing water in the mix, and (3) the use of as much as 275 pounds of Vogt tube ice per 2-yard batch of concrete.

In a nearby power and refrigeration plant were a horizontal steam boiler for winter control, two Sullivan stationary compressors, an Ingersoll-Rand and a York ammonia compressor, a 5,000 and a 4,000-gallon water purification tank, and two 750-kva General Motors diesel-electric sets. By generating its own power, the contracting firm made sure everything would run on schedule.

The ammonia compressors furnished refrigeration to the Vogt ice machine, which made about 2½ tons per hour. It was one of the same machines used at Fort Gibson Dam in Oklahoma. The refrigerant also cooled the mixing water, which passed through coils in a tank.

Batched material from the Johnson bins dropped to two Koehring 2-yard mixers, where a small amount of air-entraining agent was added. The fresh concrete was dumped through a conical bin to 2-yard Blaw-Knox buckets with manual gates. Four International KB-8's, with flat-bed trailers, took the material out to the cranes, three buckets at a load.

Since concrete work did not begin until 4:30 p. m., extensive lighting of the area was done. McCormick set 90-foot towers on each side and one down in front, each with fifteen 1,500-watt bulbs ablaze. Plenty of lights were rigged on the crane booms, and there

(Concluded on next page)

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were local lights down on the towers. It was a mighty elaborate setup for the size of the pours, but that Carpenter Superintendent Benson had a way of setting up plenty of those small pours ahead of the concrete men every day.

Concrete Is Water-Cured

Concrete had to remain continuously wet during the curing period—and that meant keeping the water on while the she-bolt holes were patched with dry mortar—for 14 days.

At Fort Randall it meant continuous sprays, hose men on every tower, other men in rain gear stripping forms all day long. The water filled pours below that were about ready, and these had to be dried up before concrete was placed. On a card at each tower was painted the status of curing. Water from the whole thing trickled over to a pump, where it was recirculated.

The use of membrane cures was disapproved, except for patching.

They kept the concrete wet. You can do it with enough hose and enough pumps.

In between all these problems, sandblasters cleaned the vertical joints, and other men cleaned the bonding joints down to good clean aggregate.

Employee Morale

Employee morale could have been more of a problem than it was, if human conditions had differed but little. Employee morale remained high because there were a fine bunch of construction stiffs around, with a project manager who understood and sympathized with their problems. They also had a bunch of hard-working wives who worked, gardened, and cheerfully made the most of their homes.

The company furnished a family with a 22-foot trailer, 100 kilowatt hours of electricity, and water, for \$75 a month; \$25 of that was for the parking and water and power; \$50 was for trailer rent, and it could be applied on the purchase of the unit if the family wished.

Each trailer back door opened into an 8 x 8-foot bathroom. It gave the men a chance to change clothes or take off muddy boots before coming in.

The sky was the limit on landscaping. Men had access to the scrap lumber pile. Curved walks, little fences, and other things appeared overnight. McCormick then put up a weekly prize for the best-kept yard or garden. It worked wonders. One lady won often, with her showplace lawn and a vegetable garden that was the envy of Pickstown. The families took a barren piece of Dakota hillside and made it bloom. Children got to know McCormick and the other supers by their first name.

But the crowning achievement in human relations he made in a business way. Every day the key executives ate lunch together, and talked shop. Problems were discussed. Men went back to work with a unity of purpose seldom seen on contract work. On cheese and crackers and ribald banter they accomplished more than Malik can on caviar.

Johnson-Winston is ahead of schedule. The intake structure, started April 1, 1949, will be finished well ahead of the January 1, 1952, deadline.

Personnel

You've met a few of the contractor's people. Others in key positions included General Superintendent Mike Grippio, Steel Superintendent R. D. McCormick, Mechanical Superintendent G. T. Armstrong, and Office Manager H. W. Gustafson.

The Corps of Engineers is using 322 people at Fort Randall Dam, headed by Colonel Henry J. Hoefer, Omaha District Engineer. G. O. Evans is Area Engineer, C. B. Stokes is his assistant, C. R. Brown is Chief of the Construc-

tion Division, and Max Howard is Resident Engineer.

Fort Randall Dam is a Corps of Engineers multiple-purpose project. Contemplated benefits are flood control of the Missouri River with incidental power, navigation, and recreational benefits. The ultimate powerhouse installation will generate 320,000 kw of energy. Its 107,000-acre (maximum) lake will store 6,200,000 acre-feet of water from the 263,000-square-mile drainage area. Cost is now estimated at about \$165,000,000 with 4 of the 8 power units installed in a powerhouse initially constructed to house the ultimate installation.

Accidents don't happen; they are caused. Remember: safety always pays.

New Bulletin on Dryers

Applications of Standard - Hersey dryers are discussed in a new bulletin issued by Standard Steel Corp., 5001 Boyle Ave., Los Angeles 58, Calif. This is the first complete dryer bulletin to be published by Standard since its acquisition of the Dryer Division of Hersey Mfg. Co. of Boston, in January, 1950. It points out the types of dryers most suitable to handle various kinds of material.

Continuous and batch dryers and rotary kilns, coolers, and calciners are described and illustrated. Also discussed are dryer construction features and the engineering and production facilities offered by Standard.

A special section is devoted to the

recently improved Standard - Hersey pilot dryer which can be adjusted to duplicate with reasonable exactness the performance of any type of rotary dryer on a laboratory test basis. This machine, it is said, helps to determine drying characteristics of substances to be handled and thus avoids costly full-scale trial-and-error methods.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 601.

Joins San Francisco Staff

Walter H. Kramer has been transferred to the San Francisco field sales and service office of The Cooper-Bessemmer Corp., builder of diesel engines, gas engines, and compressors.

Axel Osberg, left, of Osberg Construction Co., Seattle, Wash., and Wayne Stowe, superintendent, with the 6 LPC Motor Scrapers used on the Stevens Pass job.



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ON the Washington State Highway job to eliminate a dangerous approach to Stevens Pass, Osberg's six TS-300 Motor Scrapers averaged a load every 8 minutes under tough conditions. Approximately 500,000 yards of glacial till ranging from tight coarse gravel to hard almost-shale-like blue clay had to be moved over a plus half mile haul of rough going, with a 25% grade to travel on the return trip. In gravel, the Motor Scrapers were getting 14 yards per trip, while in the clay they were heaped to an average of 18 yards. Main tracks of the Great Northern Railway near the fill, and heavy traffic on an intersecting county road further complicated the job.

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2- and 4-yd. Scrapers for track-type and



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Contractor Adapts Concrete-Placer Rig

Sometimes contractors double as inventors. Such is the case on the Corps of Engineers Compton Creek project near Imperial Highway and Central Avenue in Los Angeles, Calif. P. & J. Artukovitch combined a single-drum Foote paver with a 1-cubic-yard Gar-Bro bucket and elephant-trunk attachment. A special bail on the bucket was made to provide for boom angle adjustment and a special top extension was added to raise the bucket capacity to 36 cubic feet. This rig was used to mix and place concrete on walls and bottom of the channel lining.

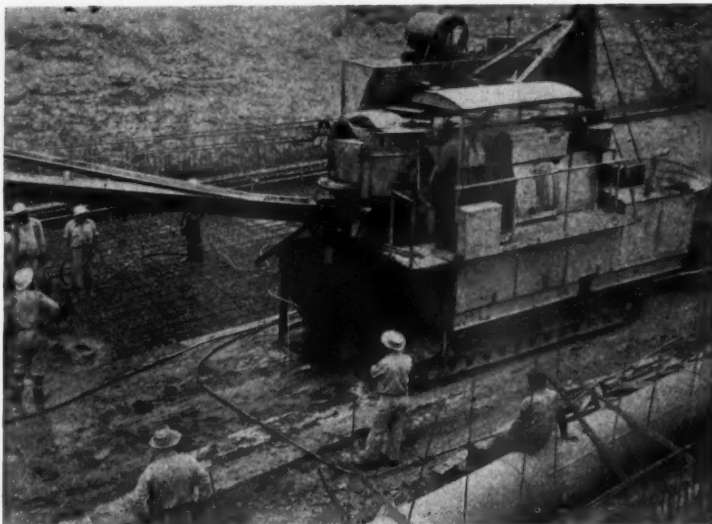
New Kit of Drills

A new kit of rotary Konkrete Kore drills consisting of six individual drill bits has been announced by the Tilden Tool Co., 1995 N. Fair Oaks, Pasadena, Calif. The drill bits are packaged in a handy roll-around plastic case with protective end flap and with fabric ties to secure the kit when not in use. The kit contains three centerless-type bits, sizes $\frac{3}{16}$, $\frac{1}{4}$, and $\frac{5}{16}$ inch; and three in the Kore type, sizes $\frac{1}{2}$, $\frac{5}{8}$, and $\frac{3}{4}$ inch.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 565.

Expansion No. 2 Cummins

Last September, Cummins Engine Co., Inc., of Columbus, Ind., began construction of a new Stores Center Building designed as a central storage place for all materials and supplies. Now it announces that it will extend its DD fuel-



Contractor Artukovitch teamed up this Foote paver and Gar-Bro bucket for channel lining work at Compton Creek, Calif.

pump building, completed 18 months ago, by 9,600 square feet. These new facilities will increase the size of the plant more than 30 per cent.

Setting Acoustical Board

Short-form specifications and comparative cost data for a fast "sagproof" method of installing acoustical tile and board with Nelson Quick-Clips are included in a 4-page bulletin issued by the Nelson Stud Welding Division of Morton Gregory Corp., Lorain, Ohio.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 614.

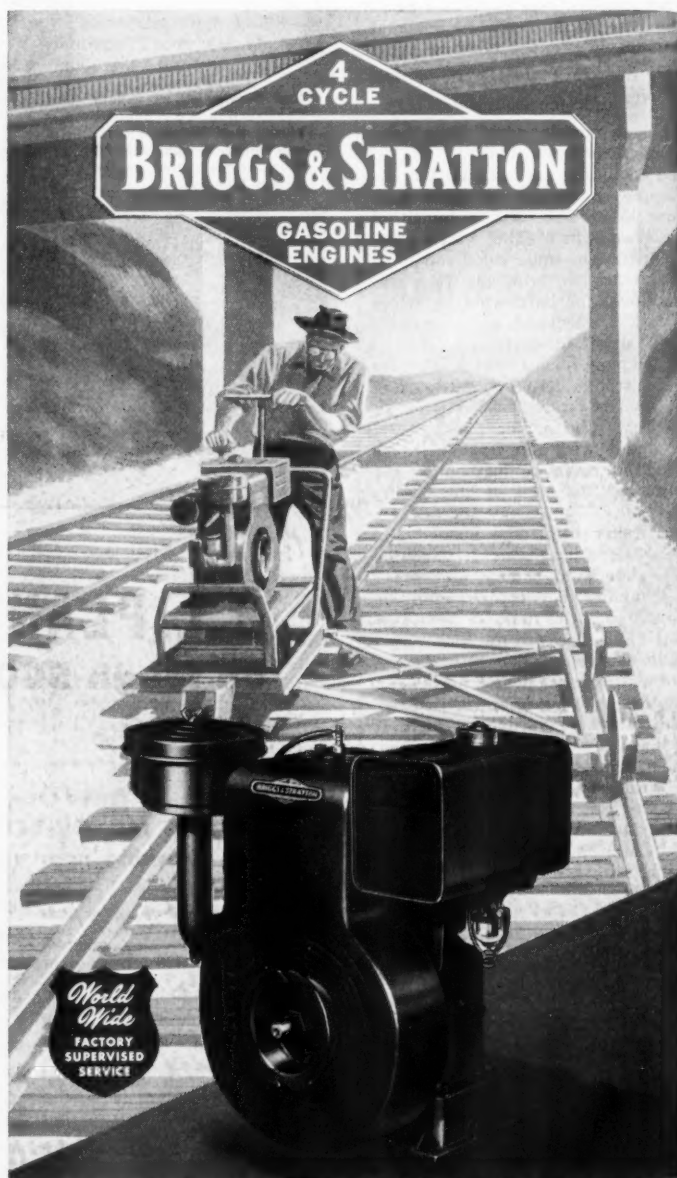
Building Maintenance

A new "Maintenance Checking Chart" is offered by United Laboratories, Inc., 16801 Euclid Ave., Cleveland 12, Ohio. It lists many common building maintenance problems and offers a solution for each. It describes over 100 products and processes for maintenance of floors, roofs, interior and exterior walls; waterproofing; painting; etc.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 566.

Engineer Opens D. C. Office

G. G. Greulich, Consulting Engineer, has opened an office at 610 Dupont Circle Bldg., Washington 6, D. C., where he represents Drilled-In Caisson Corp., W. E. O'Neil Construction Co., The Union Metal Mfg. Co., and Western Foundation Co. Mr. Greulich used to be with the Speciality Products Division of United States Steel Co.



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Traction Driven Broom Model 106




LITTLEFORD Power Driven Model 108 and Traction Driven Model 106 Highway Brooms have the Hydraulic System for raising and lowering the Broom—and too, this hydraulic system saves wear on the broom, because the tension on the road surface can be regulated. There's no need to have the full weight of the broom resting on the road surface.

MONO-FRAME CONSTRUCTION of the Littleford Highway Brooms makes these units sturdy, yet light weight, gives the operator better vision of the broom, makes it easy to handle and shortens the turning radius.

TWO-WAY BROOMS—both Littleford Brooms can sweep in either direction and it takes only 30 seconds to change from one direction to the other. Both models can be equipped with Sprinkler System and model 108 Power Driven can be equipped with a Dust Blower Unit.




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- Tool Heaters
- Trail-O-Distributors
- Asphalt Supply Tanks
- No. 101 Utility Spray Tanks
- 84-ND Asphalt Kettles



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485 East Pearl St., Cincinnati 2, Ohio

Let's Stop the Leaks In Highway Revenues

(Continued from page 3)

from local to district office, from district to division office, is well known. To show what can be done by giving your engineers wholehearted support, here is a recent experience which we have had in Wyoming.

In one instance the Bureau insisted that we should have a 300-foot right-of-way for a by-pass truck route adjacent to Casper, a small western town with a population of about 25,000. Two two-lane highways separated by a parkway and two access roads might be desirable in New Jersey or New York; but our department engineers, after taking all the traffic counts and making every other proper engineering survey of facts, had determined that one three-lane route with one access road and 100 to 120 feet of right-of-way would be adequate. We solved this problem by getting representatives of the various divisions and the district offices of the Bureau together at one meeting, finally convincing them that we should have only half that amount of right-of-way and that the added construction was unwarranted and unnecessary. We saved the taxpayers, in that one afternoon of discussion, an estimated \$100,000 in right-of-way acquisition costs alone, plus the costs of the unnecessary construction which had previously been insisted upon.

Another Bureau regulation which results in many instances in the loss of highway-user revenues is the one of April 21, 1945, which requires that all materials shall be furnished by the contractor in construction of highways. The regulation does have a provision for an exception, but I can state from experience that the exception is meaningless. That regulation has cost my state a lot of money and no doubt has been costly to other states which operate on a businesslike basis.

Bidding on materials through the highway department pays big dividends, since the department is not put in the position of being forced to pay someone a profit on buying the basic materials for use in construction jobs. Moreover, the field is open for all bidders and not restricted to those of the contractor's choice. Therefore, I seriously recommend that renewed consideration be given to our request for repeal of this costly regulation.

As a further example of an uneconomic requirement, the contractor is required upon completion of work to submit Forms PR-47, PR-100, and PR-200, showing a final record of material used in construction and a report of employment. These forms are a carry-over from the depression days of the early 1930's; they do not serve a department in any useful way. They cause the contractors and the Federal and state departments much additional work and expense in compiling useless statistical data; such work and expense otherwise could be saved and used for building additional highways.

Legislative Leaks

Frequently basic laws are recommended or adopted which are wholly unrealistic and uneconomic, which entirely disregard methods of sound administration. Such laws constitute substantial leaks in highway-user revenues. For example, the Highway Act of 1950, Section 2, provides:

"Any state desiring to avail itself of the benefits of the funds apportioned for expenditure on the Federal-Aid secondary highway system shall establish in its state highway department . . . a secondary-road unit, and such department shall be suitably organized to discharge to the satisfaction of the Secretary of Commerce the duties herein required; . . . any state highway department may arrange with

any county or group of counties having competent highway engineering personnel . . . to supervise construction and maintenance on a county-unit or group-unit basis . . . of secondary-road projects."

In Wyoming, for example, a secondary-road unit is absolutely unnecessary and undesirable. We need primary and secondary funds to round out our small organization. Here again the expenditure of secondary funds may result in requiring us to spend a large sum of money to benefit a very few, where more heavily traveled highways would have to be neglected because of lack of funds. The county proposal is equally undesirable and in my opinion could be costly because of opening the door for construction dictated only by political expediency.

State Diversion

Direct and indirect diversion of highway-user revenues still occurs in many states and constitutes a serious leak in those revenues. The National Highway

Users Conference reports that in 1949 twenty-four states diverted some part of the moneys they collected from highway users to other than highway purposes, and in 10 of those states motor-fuel tax rates were increased during the same year. According to the Conference, Rhode Island is the principal offender, having diverted 46.2 per cent of its funds for nonhighway purposes. Other leaders were Flor-

ida with 36.8 per cent, Georgia 36.2 per cent, Texas 19.3 per cent, New York 17.4 per cent, California and the District of Columbia 15 per cent each, and Washington 14.4 per cent.

The extent to which diversion has occurred during the past 25 years may be best illustrated by some recent Bureau of Public Roads figures. From 1925 to 1949, more than \$2,800,000,000

(Continued on next page)

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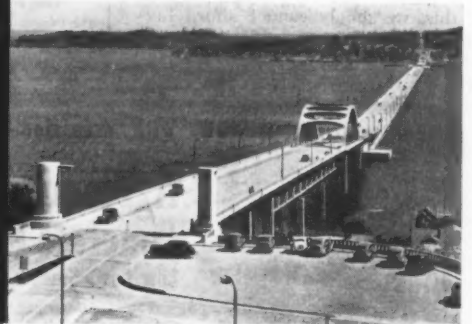
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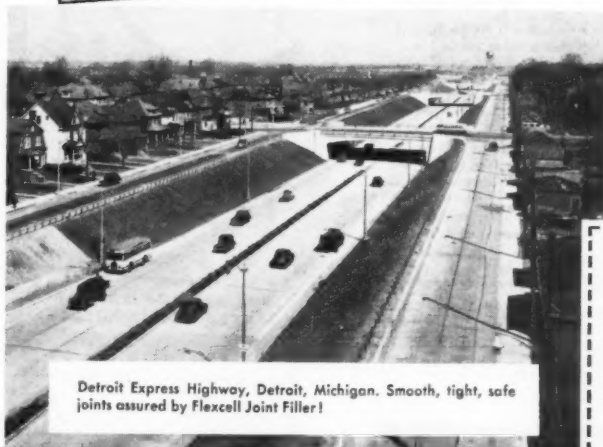
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Let's Stop the Leaks In Highway Revenues

(Continued from preceding page)

of highway users' taxes was diverted by the states for purposes having nothing whatsoever to do with highways. During the same 25-year period the states spent approximately \$8,700,000,000 of motor-vehicle tax revenues for new highway construction. Over the 25-year period about one-third more highway mileage could have been built if all the money collected from motor-vehicle users had been devoted exclusively to highway purposes.

There are also many abuses in the refund system on gasoline taxes and in connection with the license fees which are measured by loads; due to poor enforcement or weak registration systems, trucks are not being required to pay those fees now specified by law.

Dispersion

There is another leak which is almost as great but is more difficult to trace directly—dispersion. In recent years there has been a trend to scatter highway-user funds over roads of relatively small importance to the detriment of the main traveled highways and secondary roads in our states. Since 1938 the amount of state funds shared with local units has increased 124 per cent. In 1949 alone the total allocation of state highway-user revenues to the support of local roads and city streets was over \$626,000,000. In 1938 it was about \$280,000,000 and in 1941 it totaled \$354,000,000.

Dispersion results from political pressure, frequently by minority groups at the local or county level, on the legislature or on the department. Invariably it results in better roads for the few at the expense of better roads for the majority.

Since 1930 the states have taken over about 120,000 miles of county roads and about 34,500 miles of urban extensions of state highway systems. To throw the situation further out of balance, the local units have steadily reduced their expenditures on their own roads.

We know from experience that our interstate highway system and the principal arterial routes are vital factors in our national defense. In view of this, we simply cannot afford luxuries. Even if it were desirable and

economically feasible to build a paved road to every farm, we must view such programs with extreme skepticism at a time when the importance of our main traveled roads has been doubled by the national emergency and at a time when we have very nearly reached the practical limits of highway-user taxation.

Spending on Political Basis

Experience has shown in recent years that political considerations have frequently played a dominant role in the spending of highway funds. Investigation in one state recently disclosed that the highway department had formulated no comprehensive highway plan but instead had started numerous disconnected projects in every county in the state.

Those in county government there may have been satisfied from the standpoint of having some money spent in their respective counties. However, the result of that program was that the state increased its taxes and issued highway bonds to finance an uneconomical highway program; that department is now agitating for more taxpayers' money to finish the jobs which were started not on a need basis but on a political-expediency basis.

Padding the Payrolls

Political corruption is also reflected in the administration and operation of some highway departments. It has been said that the highway department payroll in one state has been loaded with so many political hangers-on that they get in the way of the construction equipment. To keep these political appointees occupied in some fashion, it was charged that they were organized into gangs; one gang would build post-holes, another would fill them in. In the same state a crew of men was lay-

ing blacktop for a new road surface while another crew going the opposite direction on the same road was painting a line down the center. After these two crews met and passed, the line-painting crew kept right on painting over the newly laid blacktop and the top-laying crew kept right on covering up the newly painted white line.

Employee Selection

In many cases employees are added to the department payroll without any consideration to experience or qualification. In some states the spoils system still operates so that each time there is a change in elected officials there is a change in the department personnel. This has made for a lack of job security which has kept many competent, conscientious, and trained engineers from accepting employment with the department and caused others to leave at the first opportunity.

It has been cited that most bookkeepers in the highway department are patronage employees. Evidence has

been found of situations where the engineer in charge of large contracts held no engineering degree and was in fact not even registered as an engineer in the state.

Purchasing Policy

Millions of dollars of the taxpayers' money have been squandered by highway departments through the wasteful and inefficient purchase of equipment and supplies. Highway department officials have been forced to purchase inferior products at prices above those quoted for better products, chiefly because of political considerations. In some states the highway contractors have been forced to pay inflated prices for materials in order to secure contracts.

For years one state has patronized certain dealers holding state franchises for particular lines of equipment, paying the list prices on millions in purchases and getting no better prices than the small contractor who buys one

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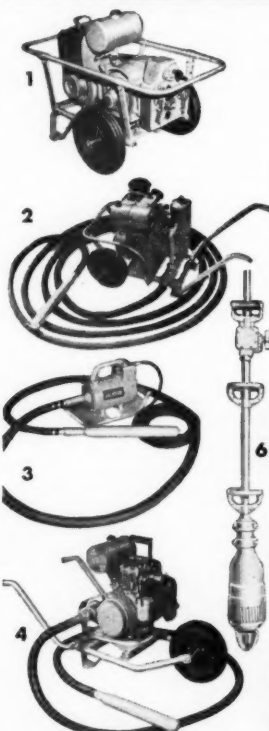
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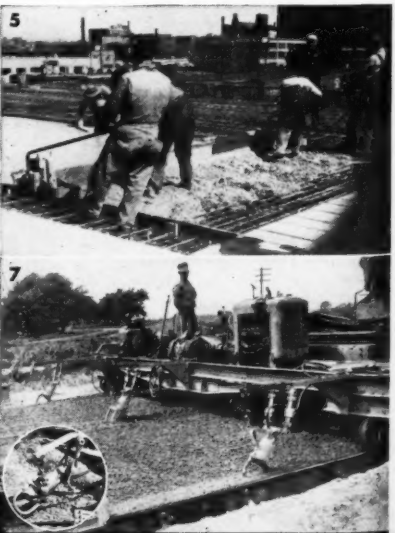
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piece of equipment a year. That state did not call for bids and bought equipment on a noncompetitive basis.

A department should protect its purchases by adequate specifications covering all equipment and materials, and the purchases should be made upon bids. If that practice is followed, the department can expect to get its full value for money spent.

Employee Training

Instruction of employees using equipment in the field is equally important. If men do not know how to use equipment, they may cost the state many thousands of dollars because of their inefficient methods of operation. If you are to get the maximum efficient help from an employee, you must see that he is properly instructed to do the job assigned. On the other hand, if you give a good workman inadequate equipment, you may make a drone out of him.

Gas-Tax Collection

In the matter of collection of gasoline taxes, I strongly recommend to you the license-tax system rather than the customary sales-tax system. The license form of tax results in collection of the tax from the source on the first sale and eliminates the opportunity for tax evasion present in the sales type of tax on subsequent sales by distributors and dealers. I also strongly recommend that you urge your legislatures to provide against gas-tax refunds and exemptions. Such a source system without refunds eliminates the opportunity for leaks and abuses, and greatly reduces tax evasion as well as heavy disproportionate expense which is involved in collection and enforcement.

Leaks in Highway Construction

Some procedures which have a definite bearing on construction costs, but which are not essential to the soundness of the construction and may be considered "leaks", are as follows:

1. Excessive fine-grading, slope finishing, rubbing of concrete surfaces, and other items which require excessive man-hours of labor.
2. Requiring long hauls on more costly materials instead of using suitable local materials found on the job.
3. Failure to provide designs which will permit full use of contractors' equipment, for mainly through increased mechanization can costs be lowered.
4. Failure to provide a reasonable time limit in which to complete the work, with consideration for seasonal limitations, availability of labor, material supply, and other factors with which the contractor must deal.

The construction field is first in the total of expenditures of highway-user revenues; in this field, we, as administrators, have the responsibility of closing all possible leaks, however small, which contribute to a loss of highway funds. A sound construction policy requires careful consideration of items previously discussed and of the following needs:

1. A carefully planned program within the means of the state which will best serve the traffic needs as they become evident.

2. Well made surveys, which will furnish the information necessary to determine construction requirements economically.

3. A sound design, meeting these varying standards, with proper consideration for safety features and simplified to attract the bidder.

4. A pool of qualified and competent contractors who are ready and willing to undertake the work with their own organizations and equipment and who will give the state the benefit of genuine competitive bidding.

5. A well qualified and alert construction organization, well able to determine the important details and willing to assist contractors in efficient execution of the work to the end that the state gets "value received" for every highway-user dollar spent.

Officials' Responsibility

As state highway officials, we are, in a sense, one of the most important groups in government today, with direction over the spending of about one-

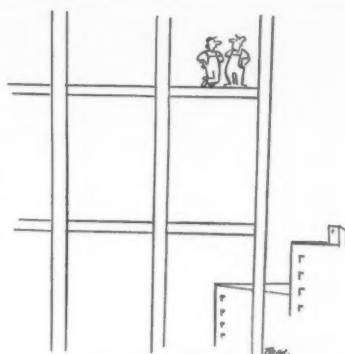
third of all state revenues. We are in a real sense custodians of the peoples' money and we have a great responsibility to see that it is not wasted.

We are expected to be their engineers; we are expected to provide the best roads possible. That is not always as easy as it may seem, because politics are frequently involved. I think when we are faced with this problem, it is well to remember the old saying, "If a thing is morally wrong, it can't be politically right." If we are good engineers, honest administrators, and careful planners, we will come out far better in the long run, because we will win and have the justified support of the people generally.

From a paper presented to the Committee on Administrative Practices of the American Association of State Highway Officials, at its 1950 Annual Meeting in Miami, Fla.

Fiftieth Year for S-A

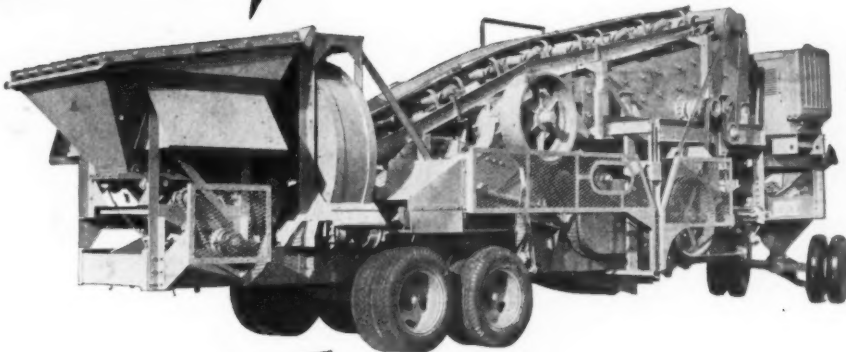
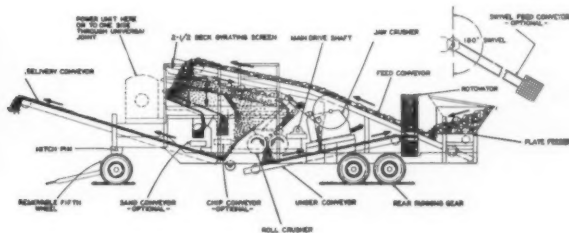
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Aurora, Ill. The company began operations in a single 80 x 120-foot building in June of 1901. Today it occupies a 13-acre site with 230,000 square feet of plant space. Branch plants are at Los Angeles and at Belleville, Ontario, Canada.

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Penn Turnpike, West, Moves to Completion

Grading Rougher Than on Eastern Extension; Typical Contract Includes Drainage, Structures, and Paving

• WITH the completion of the 100-mile eastern extension of the Pennsylvania Turnpike in October, 1950, as per schedule, construction interest shifts to the western extension where contracts are being pushed so that this 67-mile stretch may be open for traffic by mid-1951 according to plan. Work on the western extension got under way in October, 1949. It begins at Irwin, Pa., the western terminus of the original 160-mile Pennsylvania Turnpike, and runs northwest, by-passing Pittsburgh on the north, to end at the

Ohio state line just east of Petersburg, Ohio, about 24 miles south of Youngstown, Ohio. The estimated construction cost on this 67-mile portion of the Turnpike will be around \$53,000,000. (See C. & E. M., June, 1950, pg. 34.)

By this time the features of this great through superhighway are common knowledge. Like the earlier construction, the western extension has a 200-foot fenced-in right-of-way through the middle of which runs a 78-foot roadway. The roadway includes dual 24-foot pavements of 9-inch uniform-thickness reinforced concrete having a straight slope to the outside at the rate of 4 inches in 24 feet. The pavements are separated by a 10-foot medial strip depressed to the center at the rate of 1 inch to the foot. Flanking the outside of the pavements are 10-foot stabilized shoulders that slope 1 inch to the foot. A 6-inch special subgrade on which the pavement is laid is continued out under the shoulders providing a foundation and drainage course. Cut and fill slopes start at the edge of shoulders. They are 1½ to 1 in cuts and where the fills are over 10 feet high; in fills under 10 feet the side slopes are 4 to 1.

Drainage includes a line of 6-inch tile underdrain, 2½ feet below the center line of the medial strip, running the full length of the job. The underdrain feeds into inlets or cross drains, 15-inch minimum size, laid across the road at intervals not greater than 200 feet. The cross drains empty into pipe laid longitudinally in cuts at the edge of the roadbed. These longitudinal drains are usually perforated corrugated metal, 15-inch minimum. Storm water moves along to the fill sections where it outlets into paved channels or into pipe sunk in the slopes.

The design of transitional spirals and superelevated curves is for vehicular speeds of 70 miles per hour. Grades do not exceed 3 per cent, and the maximum curvature is 4 degrees. The terrain in western Pennsylvania is much more rugged than in the east where the eastern extension cuts through gently rolling farmland. All contracts on the western extension of the Turnpike entail heavy grading through rough hilly country.



C. & E. M. Photo

A Bucyrus-Erie 54-B shovel loads a Euclid in a 100-foot-deep cut for the western extension of the Pennsylvania Turnpike. A slide that occurred in the cut was probably caused by coal deposits in the shale side slope.

imum curvature is 4 degrees. The terrain in western Pennsylvania is much more rugged than in the east where the eastern extension cuts through gently rolling farmland. All contracts on the western extension of the Turnpike entail heavy grading through rough hilly country.

All-Inclusive Contracts

In constructing the western extension, the Pennsylvania Turnpike Commission divided the major bridge and viaduct work into ten contracts covering substructures and superstructures, and thirteen major roadway contracts. All the roadway contracts included grading, drainage, structures, and paving over sections of the Turnpike ranging from 1.8 to 5.2 miles in length. The structures in these contracts included the bridges to be built for the elimination of crossings at grade, and spans over the lesser streams. Large over-water crossings were awarded as separate contracts under major bridge and viaduct work.

A typical roadway contract described here covers the work of Ralph Myers Contracting Corp. of Salem, Ind., which was awarded the grading, drainage, structures, and paving on Section 31D on its low bid of \$3,068,107.26. Work on this 4.12-mile section got under way

(Continued on next page)

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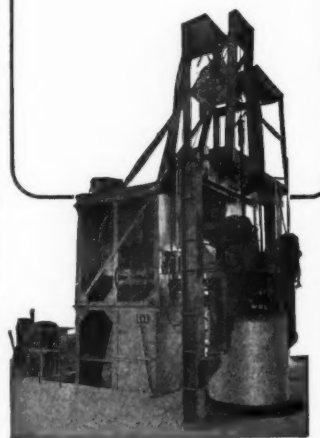
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the latter part of January, 1950. By September the grading and drainage was finished, with the structures and paving being completed before the end of autumn.

The prime contractor handled the grading himself along with the storm-sewer and pipe installation. He subbed out some 40,000 linear feet of tile underdrain to Louis S. Wescott, a general contractor of Pittsburgh, Pa. The structures, which included nine bridges and two small arches, were built by Koppers Co. of Baltimore, Md. Paving was sublet to Harry Erb, Inc., of Philadelphia, Pa.

Heavy Grading

Section 31D begins in Westmoreland County, southwest of Murrysburg on U. S. 22, the William Penn Highway, and runs northwesterly into Allegheny County to end at Beatty Road. It crosses over both the old and the new portions of U. S. 22 and the tracks of the Pennsylvania railroad. On this 4.12-mile section, the earthwork totals over 1,750,000 cubic yards, with cuts as deep as 125 feet and fills as high as 110 feet. Material included limestone, sandstone, shale, coal pockets, sand, and clay. These coal deposits in shale cut slopes were believed responsible for some slides that occurred. Along one 300-foot stretch, where a cut reached a depth of 100 feet, a slide wiped out a 20-foot-wide bench halfway up the slope. In removing the slide, the contractor also took out enough material at the bottom of the sidehill cut to widen the roadway 20 feet as a safety measure against possible future earth movements.

Two types of drilling equipment were used in the rock work. Large holes, 6 inches in diameter and 40 feet deep, were made with a McCarthy rock and earth drill. The 6-inch bits came in 6-foot lengths, and the drill operated off the back of a Ford truck. These large holes were spaced on 25-foot centers. Holes of lesser depth, up to 18 feet, were drilled with eight Gardner-Denver and Chicago Pneumatic wagon drills driven by five air compressors—two Jaegers at 600 cfm, two CP's at 315 cfm, and one Ingersoll-Rand 500-cfm compressor. Used with the wagon drills was 1½-inch drill steel in lengths of 6, 12, and 18 feet. Drilling was done with Timken carbide insert bits, usually 2½-inch size on the 6-foot lengths, 2¼-inch on the 12, and 2-inch bits when drilling with the 18-foot lengths of steel.

Wagon-drill holes were spaced on an average of 6-foot centers both ways, and from 100 to 150 holes were fired at a time. Both Atlas and Du Pont dynamite, 40 per cent strength, were used for blasting, with an average of ¾-pound of dynamite required to shoot one cubic yard of rock.

Earth-Moving Equipment

The earth-moving got under way on February 22 when a single power shovel took the first bite of dirt. On March 1 another shovel went to work, and by the first of April five 2½-yard shovels were in operation—two 54-B Bucyrus-Eries and three 80-D North-west. Material from the shovels was moved chiefly with 30 Euclids—20 end-dumps holding 13 yards, and 10 bottom-dumps built up with side boards to hold 17 yards. Hauls were short, averaging only 1,100 feet.

Tractor-scraper units moved the rest of the dirt, including some shale and rock which was first loosened by Caterpillar rippers pulled by D8 tractors. Scrapers included 7 LaPlant-Choates holding 33 yards; 3 Wooldridge self-propelled units at 14 yards; and 4 LeTourneau 12-yard Carryalls. All scrapers were pulled by D8 tractors, the hauls ranging from 500 to 1,000 feet. At the peak of operations there were 31 Caterpillar tractors on the job—29 D8's and two D7's—pulling scrapers

or rippers, serving as pushers in loading the scrapers, towing sheepfoot rollers, or leveling off the fills.

Dirt fills were built up in 8-inch layers, and the rock in 24-inch layers. Compaction to 95 per cent Proctor was achieved with both sheepfoot and smooth-wheel rollers. Sheepfoot equipment included 3 Gebhardt and 2 LeTourneau rollers, while the smooth-wheelers consisted of 4 Buffalo-Springfield 10-ton, 3-wheel rollers. Tank trucks for watering the fills were on hand but saw little service because of the wet nature of the material. Final shaping of the roadway was handled by three Caterpillar No. 12 motor graders.

Two Shifts

When the dirt-moving got into high gear, three of the big 2½-yard shovels were put on two shifts along with the necessary Euclids for hauling. Tractor-scraper units were held to the single shift. Production increased rapidly in the early spring, the peak being reached



C. & E. M. Photo

A Parsons Trenchliner, Model 250, opens a trench for 6-inch tile underdrain on Louis S. Wescott's contract.

in the month of May when approximately 715,000 cubic yards were moved. The concentration of material in two cuts of 105,000 and 257,000 yards permitted good yardage over fairly short hauls.

Equipment was refueled in the field by three service trucks holding 750 gallons each. They in turn were filled from a 14,000-gallon storage tank at the contractor's shop. The Gulf Oil Co., (Concluded on next page)



Showing Hempt Bros.' stock pile of Bethlehem Dowel Units near batching plant. Note that units nest easily, take little space.

28,000 Ft. of New Roadway on U.S. 11

The road-improvement program of the Pennsylvania Department of Highways called for the elimination of a dangerous, worn stretch of U. S. 11, between Selinsgrove and Port Trevorton. The new 3-lane highway, shown under construction in these recent pictures, is some 28,000 ft long, and includes five bridges. The contractor was Hempt Bros., Camp Hill, Pa. Bethlehem supplied bridge reinforcing, structural steel, bar mats and dowel units.

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Head-on view of first-lane paving. Bethlehem Dowel Unit, designed to keep dowels in accurate vertical and horizontal alignment, shown in foreground.



Bethlehem Reinforcing Bars, shown installed on deck of one of the five new bridges, getting a final check by workers before concrete is poured.



Unloading Bethlehem Bar Mats from truck, along path of new highway. Contractor's large stock pile of bar mats, at left, is easily accessible.



Bethlehem Hinged Bar Mat goes into place, handled by only two men. Hinged portion folds over double, can be dropped into position quickly.



C. & E. M. Photo

During rock drilling on the turnpike extension, a 6-foot length of 6-inch bit is inserted in a McCarthy rock and earth drill on a Ford truck.

Penn Turnpike, West, Moves to Completion

(Continued from preceding page)

from Pittsburgh, furnished the oils, grease, and fuel. A crew of 11 mechanics worked seven days a week to keep the big array of road-building machinery in perfect condition.

The larger drainage pipe was laid in trenches dug by three ¾-yard backhoes—Bucyrus-Erie, P&H, and Northwest. The Universal Concrete Pipe Co. of Pittsburgh supplied the concrete pipe; the Republic Steel Corp. furnished the corrugated-metal pipe; while the tile underdrain came from the Central Clay Products Co. On the underdrain work Louis S. Wescott used a Model 250 Parsons Trenchliner for digging the trench in the center of the medial strip. The trench is 18 inches wide, and the drain is covered with a foot of gravel.

Quantities and Personnel

The major items in the 4.12-mile turnpike contract include the following:

Class 1 excavation	1,521,862 cu. yds.
Class 2 excavation, backfill	26,162 cu. yds.
Borrow	205,554 cu. yds.
Special 6-inch subgrade	232,700 sq. yds.
Pavement, 9-inch RC	141,275 sq. yds.
Bridge concrete	11,810 cu. yds.
Reinforcing steel	981,844 lbs.
Structural steel	2,421,109 lbs.
Steel-beam piling	386,232 lbs.
Inlets	250
Corrugated-metal pipe, 15 to 72-inch	11,000 lin. ft.
Concrete pipe, 15 to 36-inch	10,000 lin. ft.
Underdrain, 6-inch	22,000 lin. ft.

Ralph Myers Contracting Corp. employed a force of men that reached 150 at the peak of operations. The work was supervised by Ralph Myers, President, and Foster Myers, Vice President of the firm. James E. Lynn and Kenneth Weaver were Field Engineers, and E. D. Voyles was Office Manager.

For the Pennsylvania Turnpike Commission, this contract was under the supervision of George T. Chapman, Division Engineer, and A. H. Brill, District Engineer, in charge of Western Extension projects. A. E. Dunsford was Resident Engineer on this particular project, assisted by A. L. Golightly. The Commission is headed by T. J. Evans, Chairman; R. B. Stone is Chief Engineer.

Virginia Gears for Future

Since mid-December the Emergency Planning Committee of the Virginia Department of Highways has been busy gearing and reworking the Department's disaster plan to cope with possible enemy attack. A primary goal is to keep all roads serviceable despite the probable shortages of men, materials, and equipment. A closely related objective is that of preserving existing roads. The planning committee has already imposed temporary load limits on

roads weakened by freeze and thaw; it will also push for strict enforcement of highway load limits.

Other items on the Department's agenda include speedy completion of a state-wide highway radio network, a stepped-up training program with emphasis on emergency repairs, development of measures to retain highway employees and recruit new ones, stockpiling materials at strategic points, and inventorying the Department's resources and determining how they can be most effectively used. Close cooperation is planned with state and national civil defense agencies, the State Police, and the military.

Research Man for Pipe Co.

James R. Barnes has been appointed Research and Development Engineer for Universal Concrete Pipe Co. of Columbus, Ohio. He recently served as Chief of Surveys for Ammann & Whitney of New York, consulting engineers to the New Jersey Turnpike Authority.

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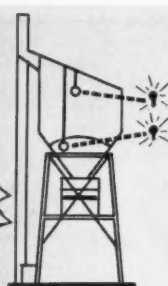
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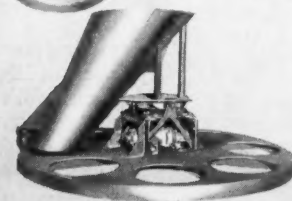


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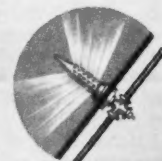
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Portrait in Print

By BILL QUIRK

Into Contracting via Sunday School

• THERE are probably as many stories concerning the start of individual enterprises in this country as there are privately owned businesses. How Arthur Whitcomb, Keene, N. H., contractor, got his start in the construction industry is a tale that could be told with good effect by parents of boys reluctant to forego an hour of play for a session of Sunday school.

As the June, 1931, graduation drew near at the University of New Hampshire, Arthur Whitcomb looked ahead to a career of electrical engineering. He had been "tapped" by General Electric as one of the bright young men with E. E. degrees to enter the service of the huge electrical concern. But this was in the depths of the depression and G-E, retrenching as all private business was doing at that time, decided to "defer indefinitely" the hiring of the young electrical engineer.

Helped. Through Sunday School

With no job, and not a prospect of one in sight, Arthur Whitcomb did some quiet thinking. His father, Frank Whitcomb, over in Bellows Falls, Vt., was making a modest living in the sand and gravel business with one shovel and four trucks. During summer vacations from college, Arthur had mastered the shovel controls working as an operator. Now, he reasoned, if he had a shovel of his own, he too might start a sand and gravel business. But shovels are expensive equipment, and the unemployed graduate lacked even the down payment. Somewhat jokingly he asked his former Sunday school teacher if he would lend him the money for the initial payment. The teacher, who knew young Arthur as an industrious, serious-minded, self-reliant individual, said that he would, and Whitcomb was launched into the construction industry.

In August, 1931, with a \$1,000 loan as a down payment, Whitcomb bought a new \$8,000 Mead-Morrison 5/8-yard shovel. The remaining \$7,000 he agreed to pay off at the rate of \$500 a month, plus interest, for fourteen months. This financial deal he hoped to swing by renting out the shovel, with himself as operator, for \$5 an hour. By working 200 hours a month, he planned to meet running and maintenance expenses, buy gas and oil, and pay off the remainder owed on the shovel. During this time the hard-working shovel-owner lived a frugal life, setting aside only \$5 a week for himself while boarding with his parents.

"The first job I got was doing some road work for the town of Walpole", Whitcomb recalled, "but it was tough making ends meet that first year. Shovel work was not as plentiful as I had counted on. Then the company from which I bought the rig went out of business, and the finance people closed in on me." By working long hours, and taking advantage of every opportunity to turn a shovelful of dirt, Whitcomb paid off his indebtedness, including the original advance from the kindly Sunday school teacher.

Growing Bigger

Now only 43, the tall, scholarly looking New Englander with the finely chiseled features has acquired in less than 20 years, 9 power shovels, 5 tractors, a fleet of 38 trucks, together with varied plant and equipment for carrying on construction enterprises which include contracting, equipment rental, supplying of ready-mixed concrete, and the manufacture of concrete blocks. A mock-up aluminum and steel scale

model of one of his Bucyrus-Erie 22-B shovels, made in his shop, stands outside Whitcomb's headquarters in Keene, as a symbol of his activities.

Getting the first shovel was the hardest. In 1933 Whitcomb bought his second, along with a gravel-washing plant, and began contracting in a small way by furnishing aggregate for a road job near Keene. He then married and settled down in Keene with his wife, Lena, a former nurse; they have two children, Robert, 13 and Barbara, 11.

After a small beginning, Whitcomb the contractor moved steadily along, engaged mostly in highway, bridge, dam, and airport construction. At pres-



C. & E. M. Photo

A loan from a Sunday school teacher, plus his own self-reliance, launched Arthur Whitcomb in the construction industry.

ent he has one airport and three road contracts under way, besides renting equipment for the pipeline now being laid between Montreal and Portland, Maine.

But his most consistent progress has been in the materials line—sand and gravel production, ready-mix concrete, and concrete blocks. Since 1946, Whitcomb's headquarters have been located on a 14-acre site on the outskirts of Keene. One large 120 x 100-foot concrete-block building contains offices, shop, and an expansive stockroom. Another structure houses the batching bins for the ready-mix concrete plant, and next to that is the concrete-block plant. At one side of the yard is a long storage shed with 27 separate stalls for trucks or other equipment. The sand and gravel wash plant is on a 10-acre site only 3 miles from the main headquarters.

Business with these material supplies has been steady and good, and shows the result of sound management.

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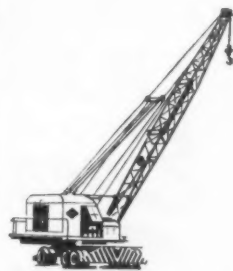
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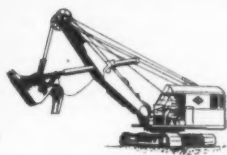
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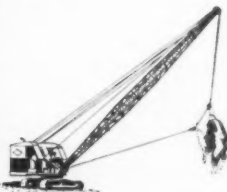
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Into Contracting Via Sunday School

(Continued from preceding page)

Plant setups are modern and efficient, manned by experienced and able personnel. Four truck mixers—one 5-yard and three 3-yard units—deliver transit-mix concrete within a 30-mile radius of Keene. The concrete-block business has been booming, with everyone hurrying to put up a house, garage, factory, or store so as to "beat the next war", as Whitcomb sees it. The demand for sand and gravel in highway and building construction has kept Whitcomb's big processing plant busy turning out material at the rate of 100 tons per hour.

Three civil-engineering graduates of Whitcomb's alma mater, the University of New Hampshire, hold key posts in the Whitcomb enterprises. G. Allen Mott is General Manager, Glenn Wright is Equipment Superintendent, and Raymond Hastings is Superintendent of



C. & E. M. Photo

Almost 20 years ago, Arthur Whitcomb paid \$1,000 down on his first shovel. Now this steel mock-up of one of his Bucyrus-Erie 22-B shovels stands outside his headquarters in Keene, N. H., as a symbol of his success.

the ready-mix-concrete and concrete-block plants.

Came the War

It was not always cakes and ale for the Keene contractor. During the last war when new highway and other construction was drastically curtailed, Whitcomb adapted himself to changing conditions, and held his business together by improvising as he went along. New Hampshire had no big war plants or war building programs to take up the slack in peacetime construction. It did get one unique new enterprise, large-scale mica mining, born from the government's need for mica, an essential mineral required in the manufacture of electronic tubes. Most mica used in the electronic industry came from India, but when the foreign supply was cut off by the war, the Government subsidized the domestic mineral. The hills and mountains of New Hampshire contain mica, usually found buried in high-level strata. Getting it out was not easy, and brought a price of \$8 a pound as compared with the prewar scale of \$2 a pound for the imported mica, then unobtainable.

Contractors picked up jobs building roads up these mountains to where the mica was mined. At one time during the war, 88 mica mines were being worked in New Hampshire. Whitcomb constructed several of these mine ac-

cess roads over difficult terrain, then went a step further and undertook the operation of a mica mine at Gilsum, a few miles north of Keene. As a mine operator he also took over the initial processing of the extracted mineral at a rifling shop which he opened in Keene. An old factory building was modernized, and forty women were put to work cutting and paring down the large sheets of mica. Handling forty females in one shop was the toughest job Whitcomb ever tackled. He hopes he is never placed in the same spot again.

"We sold the Government \$300,000 worth of mica during three war years," said Whitcomb. "The first year we lost money, broke even the next, and then got back what we lost during the third year. When the war ended the price of mica dropped from \$8 back to \$2 a pound. Naturally none of us could compete with foreign labor, so mica mining ended abruptly in this country."

Whitcomb failed to break even in another wartime business venture, dropping a "few thousand" in a well intentioned plan to provide fuel in the form of peat to Bostonians feeling the pinch of a coal shortage during the latter part of the war. Hardships and shortages at home during World War II have been fading from the memory, but at that time New England was counting its nuggets of coal as though

they were gold.

A college professor interested Whitcomb in the idea of digging peat from some of the large New Hampshire deposits, and preparing it for fuel. The contractor fell in with the plan, and tackled it as he would a construction project. Shovels excavated the peat and loaded it into trucks that hauled the material to a large field. Aggregate spreaders laid the peat in 4-inch layers which were then cut into blocks by harrows. Some difficulty was encountered in keeping the blocks from crumbling under handling. But the war ended, and with it the fuel shortage before the "bugs" were worked out of the peat-production plan. Whitcomb still considers the idea had merit, even if it was carried on at a loss in a brief operation.

High Flyer

Since the war the Keene contractor has been busy on airport construction in New Hampshire and Vermont, with

(Concluded on next page)

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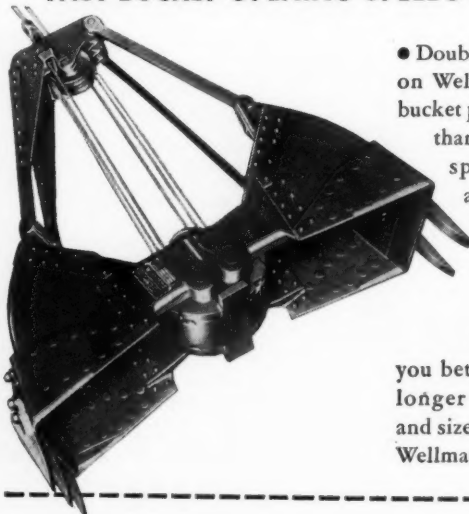
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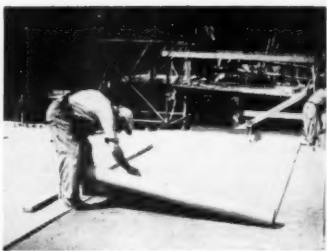
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eight good-sized projects to his credit. A flying enthusiast himself, Whitcomb has been operating his own plane since 1936 when he bought a two-passenger Cub. He now flies a Ryan-Navion four-place ship that he keeps in a private hanger at the Keene airport, only ½ mile from his office. Whitcomb flies a lot, preferring the plane to a car for getting around to jobs, delivering equipment parts to remote locations, or just for pleasure. An 8-hour one-stop flight from Keene to Miami with the wife and children is by now almost commonplace.

Whitcomb's father "retired" to Florida fifteen years ago for his health, but the warmer clime improved his physical condition and brought him out of retirement. The elder Whitcomb, now 80, got back into construction by building some dwellings and apartment houses in the Fort Lauderdale area. He owns and operates some of the larger apartments himself, and urges his sons, Arthur and Frank, the latter also in the contracting business in Vermont, to come down to Florida and really live. "He tells us that he skins alligators in the summer and tourists in the winter," Arthur related, "and has a good time doing both."

Native New Hampshire

But his interests keep Arthur Whitcomb close to his native New Hampshire most of the year. Besides his construction activities, he has a couple of snowplowing contracts—one with the New Hampshire State Highway Department, and the other with the airport at Keene—for removing snow on roads and runways. This winter work helps in keeping occupied some of his 40 year-round employees. The off-season too is the time for equipment overhaul, when every piece of construction machinery and every truck is completely reconditioned and painted in the big maintenance shop. Improvements are continually put into effect at the large crushing, screening, and washing gravel plant, the ready-mix concrete tower, and the concrete-block plant. When contracts pick up in the spring and summer, Whitcomb personnel climbs to around 100.

From his roomy office, with job pictures and photos of his planes around the wall, the big contractor—6 feet 3 and 190 pounds—can look out the window at the mock-up shovel at the entrance to the yard. Back in the yard

comes the grinding of the concrete-block mixing machine, the roar of trucks bringing in sand and gravel, or leaving with a load of ready-mix concrete. Not far away on the southeast edge of the city is a choice 60-acre industrial site, bordered by river, railroad, and highway, that Arthur Whitcomb has acquired for investment as a development for potential plant locations in Keene. The clean-cut New Englander dug a solid foundation for himself with that first shovel. More than spiritual gains sometimes result from regular attendance at Sunday school.

T. D. Williams Joins CCA

T. D. Williams has joined the staff of the Calcium Chloride Association as Field Engineer for east-central states. He was formerly Knox County, Tenn., Engineer in charge of design and construction of highways and bridges. In his new position he will headquarter at Knoxville, Tenn.



Power tools are only as portable as their power plants. Here a Kohler portable electric plant powers a saw at the site.

SEAMAN TRAV-L-PLANT NETS NEW HIGH PRODUCTION



View showing train operation developed by Glen G. Searing to do 42 miles of road in 35 working days. Tractor pulls transfer truck which is followed by SEAMAN TRAV-L-PLANT.

The SEAMAN Self-Propelled TRAV-L-PLANT



SEAMAN Self-Propelled TRAV-L-PLANT is equipped with spray bar, pump, pump tachometer and tachometer wheel. Spray bar is located just ahead of mixing rotor so that bitumen is taken into mix immediately, thus avoiding migration. Pump also handles water for soil stabilization. Offered in 7 ft. mixing width. Gasoline or diesel powered. Obtainable also without pumping equipment as the SEAMAN Self-Propelled Mixer.

FREE DESCRIPTIVE FOLDER

This new folder completely describes the SEAMAN TRAV-L-PLANT and SEAMAN Self-Propelled Mixer. Shows job scenes, gives complete specifications. Send for your copy now.



SEAMAN MOTORS, INC.

282 NO. 25th STREET

MILWAUKEE 3, WIS.

Glen C. Searing, Jacksonville, Fla., Contractor Finishes More Than Mile Per Day on 42 Mile Job

Jacksonville, Fla. "Good as a plant mix any time" says Glen G. Searing referring to 42 miles of bituminous highway he has just completed for Jacksonville County. Searing used the SEAMAN Self-Propelled TRAV-L-PLANT for mixing on the entire job. RC-1 was the binder employed and the mixing specified for 5 in. compacted depth.

DEVELOPS TRAIN OPERATION

Mr. Searing developed a smoothly operating train by hitching his transfer trucks to a tractor. The SEAMAN TRAV-L-PLANT followed immediately behind the transport. The tractor was used to pull the transfer truck because of the extremely sandy condition but this method was advantageous in obtaining an easy, steady uniform traveling speed for the entire train even in normal conditions due to the tractor low gear operation.

TRANSFER TRUCKS UNLOADED QUICKLY

Transfer trucks of 5000 gal. were unloaded in about 30 minutes each. If at any time a transfer was delayed the SEAMAN MIXER continued with the work of mixing and aerating. This phase of the work was done at 3 miles an hour. During train operation, mixing was handled at 50 ft. per minute because the oil requirement ranged between 3.7 to 5 gallons per square yard. The total average for all mixing ran about 75 ft. per minute in paths 7 ft. wide.

HIGH OUTPUT PER HOUR

As much as 6400 gals. of RC-1 per hour were put in and the hourly average for the job ran about 6200 gals. The 42 miles was completed in 35 working days, or 1.2 miles per day.



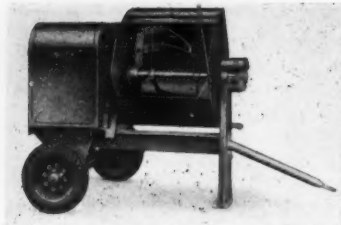
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Want a plaster and mortar mixer free? Think up a name for this Essick model, and it may be yours.

Name a Mortar Mixer And Win One, Maybe

To help acquaint the plastering and masonry industries with its new Model T-135-S plaster and mortar mixer, Essick Mfg. Co., 1950 Santa Fe Ave., Los Angeles 21, Calif., has announced a mixer-naming contest for all contractors, their families, employees, and employees' families. The person submitting the name selected for this 3½-

foot-batch mixer will receive one of the units free of charge, delivered, freight prepaid, anywhere in the United States or Canada.

The contest started March 1 and ends April 30, 1951. Specification sheets on this new mixer, and official entry blanks which must be used in submitting names, may be obtained from the company or its dealers, or by using the Request Card bound in at page 16. Circle No. 635.

New Scaffold Uses Tubing and Clamps

A new type of portable scaffolding built up from lengths of aluminum or steel tubing and quick-acting clamps has been introduced by Safway Steel Products, Inc., 6234 W. State St., Milwaukee 13, Wis. Using an ordinary wrench, an unskilled workman can assemble these parts into safe, rigid scaffolds to fit building and ground contours for all kinds of construction and maintenance work, the company says.

In erecting a tube-and-clamp scaffold, the vertical tubes are set up and linked at intervals with horizontal members. The horizontals are arranged both parallel and at right angles to the working surface to form a box-like structure with strength and rigidity. Horizontal members also act as platform supports. Upright members may safely be extended as high as 200 feet, the manufacturer reports. Diagonal bracing is provided to make high structures more rigid.

The heavy-wall tubing sections are either aluminum or steel and come in lengths of 6, 8, 10, and 13 feet. The steel type is made from high-carbon structural-steel tubing, and may be used where maximum strength is required. The aluminum type has ample strength for most installations, and is preferred for jobs where appearance and light weight are factors.

Tubes are provided with plain ends, or have alternate male and female fittings which permit coupling tubes to provide greater length. Tubes are joined by inserting the quick-lock bayonet-type fitting into the socket and rotating the tube one-quarter turn. It is unnecessary to use leveling jacks on sloping or uneven ground, since horizontal tubes can be clamped at any point on the vertical members to provide a level support for the working platform. Base plates are available.

Upright, horizontal, and diagonal sections are fastened together by means of quick-acting double clamps of two types. In the stationary type, two clamps are permanently mounted back-to-back for holding two tubes at right angles. In the swiveling type, the two clamps are mounted back-to-back on a pivot so that diagonal braces can be fastened to either uprights or horizontals at any desired angle. For trouble-free operation the forged alu-

minum clamps are made to be self-aligning with tubes of different diameters. The clamp jaws swing open wide to simplify placing of clamps over tubes. When the jaw has been closed, a pivoted screw is swung into an open slot on the end of the jaw and the hex nut is turned down with any ordinary

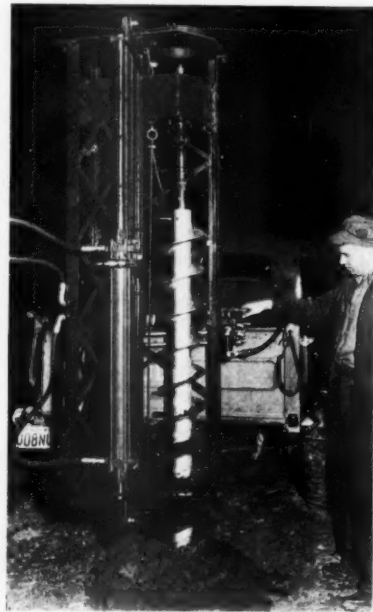
wrench. No special tools are required. It is not necessary to remove the nut completely from the screw to open the jaw. The end of the screw is upset to prevent the nut from becoming lost.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 623.

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Many Uses . . . wherever an earth-boring job exists.

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with these Distributor Features:

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- Constant sprayline pressure maintained through by-pass valve to tank.



Truck Mounted Model RMU

This low cost machine is designed for jobs that would not be economical to handle with large distributors. For the smaller operator who wants to do more work—as well as for the larger operator for whom no job is too small. A complete road and street maintenance unit for cities, towns, counties and states with limited budgets.

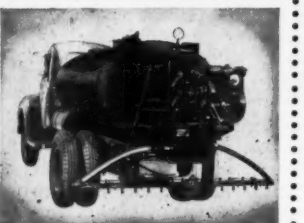
Write for literature



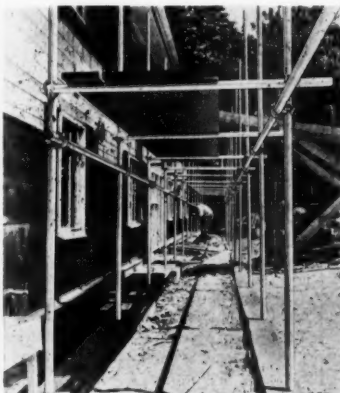
Trailer Mounted Model RMT

BITUMINOUS EQUIPMENT

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Rear view of Model RMU showing style "C" circulating spraybar



Safway's new tube-and-clamp scaffold can be assembled to fit building and ground contours from lengths of aluminum or steel tubing and double clamps. No special tools are required.

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Soil-Asphalt Blend Improves Back Road

Stabilization of Secondary Road Makes Good Progress as Contractor Sets Goal of One Mile per Day

• SO well did the Oklahoma Highway Department like its improved asphaltic stabilization on secondary-road bases that 1949 saw 50 miles built; 1950 was expected to exceed that figure by 25 miles. Maintenance engineers, jubilant for their breed of cat, say that maintenance costs promise to be low.

Typical of what Oklahomans are proud of is a section 8.92 miles long, on Route 41 west of Cordell. It has recently been treated to an asphaltic going-over by Broce Construction Co. of Woodward. What local residents once described as "the worst nine miles" along the route is now a smooth, straight highway 24 feet wide, with 7-foot shoulders along each side. The job closed one of the few remaining gaps on Route 41 between Oklahoma City and Sayre, and soon should begin to draw traffic away from cluttered, dangerous U. S. 66.

Marked by good organization, the project was finished only 12 working days after it began, July 8. A round-the-clock 7-day schedule was main-

tained, and when this magazine visited the job it was moving at the scheduled rate of a mile per day.

Soil Hauling Starts

Oklahoma's specifications for asphalt stabilization center around a soil which "must be at least 50 per cent sand, and be suitable for asphalt stabilization." The last five words are, to coin a local word, the "joner". For unless the PI is right, certain sands won't work.

On this project about half the grade, which had been put up by a previous contractor, was suitable for asphalt stabilization. A passing sample, representing a material between stations 262+00 and 277+00, showed a liquid limit of 22 and a PI of 3. All this sample passed the No. 10 and 40 screens, and 47 per cent went through the No. 200. That particular area, loaded with fines, was set up for 5.5 per cent asphalt.

Approximately half the job needed supplementary material to be acceptable. The State had designated some pits nearby, and one of Broce's first operations was the production and installation of that soil.

Using a shop-built feeder and belt conveyor as a loading device, the soil was pushed out of the pit at a rate of 200 cubic yards an hour. Two Caterpillar tractor-mounted bulldozers fed the hoppers, using their bulldozer blades to scoop the soil from the floor of the pit. Soil was sent from the hopper over a 30-foot rubber belt conveyor powered by an Allis-Chalmers engine. Five 10-yard Insley bottom-dump wagons pulled by International KB-8's carried the soil from the loader to the fill.

The only preparation necessary for this soil was spreading, and that was done by one of several motor graders.

Mixing

Broce used a P&H Single Pass Stabilizer for the mixing. It was a new machine, having done only two small jobs in Kansas and Oklahoma before moving down to the latest venture.

Asphalt was an MC-3 cutback, from 4½ to 5½ per cent by weight. Anderson-Pritchard refinery at Cyril, Okla., supplied this material, and the 90-mile haul was made by Pickett Bros. transports. When the transports arrived on the site they unloaded into four 12,000-gallon portable storage tanks. If it was easy to do so, they also unloaded direct to the four relay tank trucks which ordinarily shuttled between the storage

tanks and the P&H machine.

The asphalt was maintained at 190 degrees by a small shop-built retort, using a Cleaver-Brooks heater unit. Four relay tanks of 1,000 and 1,200-gallon capacity, mounted on Ford and Chevrolet trucks, took asphalt to the stabilizer.

Broce used a method which eliminated stops while the P&H machine was moving. A small truck-mounted transfer tank was used between the relay truck and the machine. It gave enough surge capacity so the P&H stabilizer could go ahead without stopping while another relay truck backed in. If it was only a few minutes each load that was saved, it added up to many minutes at the end of a day. Time-cutting methods such as this were part

of the secret of mile-a-day mixing.

As a general rule the P&H machine traveled 24.9 fpm where extensive digging and pulverizing were necessary. On loose material the operator shifted into a faster gear which let the machine move 33.2 fpm. In that gear the mile a day was easy.

As a part of the mixing operation, the surface of the material was sealed by a Farmall-drawn rubber-tire roller, for rain was a constant threat.

Aeration and Manipulation

The aeration and manipulation of mixed material was one of the most important steps of construction. In this step, motor graders turned the material over and over to let the volatile cut-

(Concluded on next page)

HINGED PLATEGRIP BELT FASTENER No. 500 FOR HEAVY CONVEYOR BELTS OF CHANGING LENGTH

These heavy-duty belt fasteners make a strong, flexible joint in conveyor belts, belts of any width and of from ¾" to 1½" thickness. They offer special advantages in mines, quarries or industrial setups where length or position of belt is frequently changed, because sections can be removed or added at will. Joints are opened for this purpose by simply pulling out the hinge pin.

Easily and quickly applied on the job or in the shop. Special design gives deep compression into belting and smooth, flush joint.

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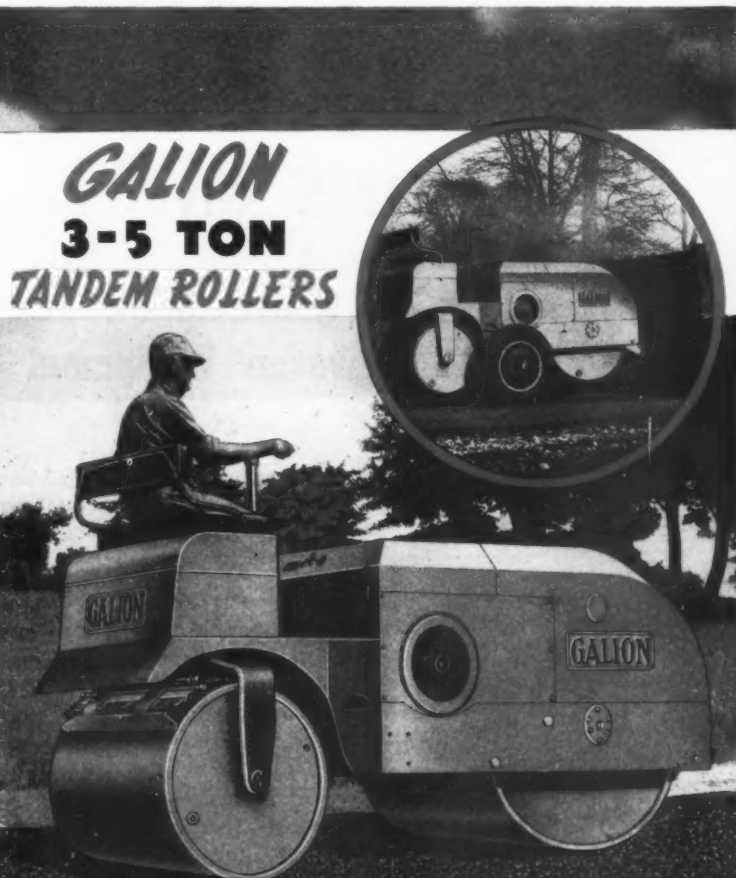


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Soil-Asphalt Blend Improves Back Road

(Continued from preceding page)

back matter escape. The operation also rounded out the mixing and eliminated any asphalt streaks in the mix.

Five motor graders, Caterpillars and Allis-Chalmers, saw service here. Before starting, the P&H machine was permitted to make three 8-foot passes a mile long each. Aeration and manipulation was then done on sections of corresponding length. As a general rule aeration and manipulation was done for a full day on each mile-long section. In any case aeration was done until the volatile matter was gone and the moisture content was down to 3 per cent or less.

The motor graders then started the laydown phase. A lift 6 inches thick was bladed out across the roadway. A tractor-drawn sheepfoot roller worked from 60 to 70 tamping hours on each



C. & E. M. Photo

A P&H Single Pass Stabilizer, fed by asphalt tank trucks up ahead, moves along Oklahoma Route 41 on the Broce contract.

mile section, and good compaction was reported. Following this preliminary 6 inches, a 2-inch lift was spread on top and rolled heavily by a Farmall-drawn

rubber-tire roller.

As the rubber-tire rig worked on the last lift, motor-grader operators policed the mile-long section with "tight" blades: blades held down hard against the base material. All unevenness disappeared, and the base became velvet-smooth.

A prime coat was then applied over the stabilized base. The roadway was shot full width, 24 feet wide, using 1,408 gallons of MC-1 for the mile-long section. At the same time, each shoulder was primed approximately four times as heavily. The shoulders were then left primed, but the roadway was given a single asphalt surface treatment.

The surface treatment consisted of 4,220 gallons of AC-4 per mile, followed immediately by a coating of 1/2-inch minus crushed-limestone chips. They were applied by spreader box in two 12-foot strips at the rate of a cubic yard of chips to every 75 square yards of roadway surface. An 8-ton steel roller set these chips in the fresh asphalt, and a power broom brought up the rear.

Ticking with the precision of a fine clock, crews and equipment of Broce Construction Co. finished the job in only 12 days and moved on, leaving behind a rural population very much pleased with the improvement that had been made in such short time.

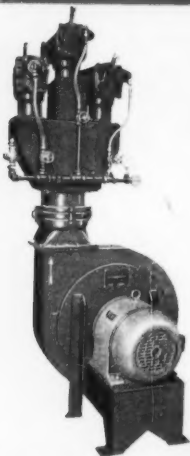
Alloy Ups Walsh

E. R. Walsh, III, became General Sales Manager of Alloy Rods Co., York, Pa., in February. He now handles the distribution and sale of the company's arc-welding electrodes for stain-

less steel; low-hydrogen, low-alloy, and mild steels; and cast and malleable iron. Mr. Walsh was District Sales Manager before his promotion to his present position.

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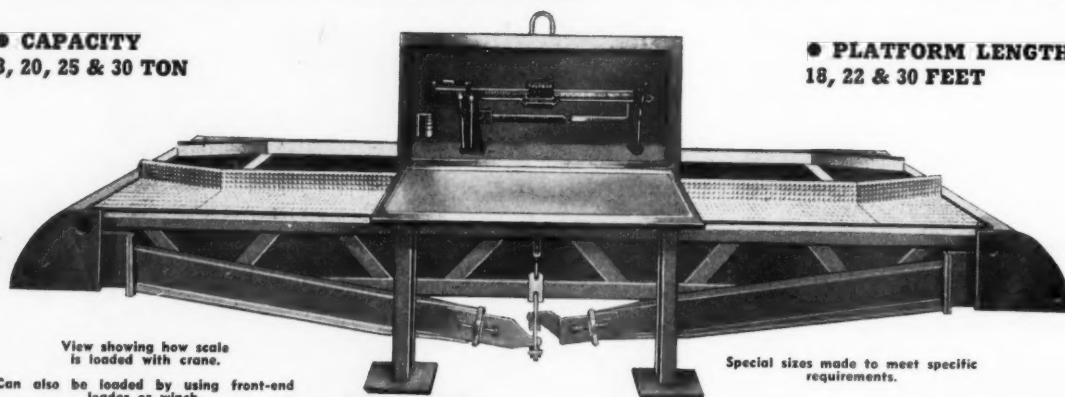
Hopkins makes the only complete "package unit" combustion system for asphalt plants—easy to install and operate, dependable, efficient, and adaptable to any dryer size or design. Why not get these money-saving advantages for your asphalt plant? Write today for literature and complete details.

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● CAPACITY
8, 20, 25 & 30 TON

● PLATFORM LENGTHS
18, 22 & 30 FEET



View showing how scale is loaded with crane.

Can also be loaded by using front-end loader or winch.

Special sizes made to meet specific requirements.

THE THURMAN PORTABLE TRUCK SCALE can be moved from job to job by removing 6 nuts which hold side arms in place. The rest of the scale can be lifted as a unit. Scale can be moved and readied for use in a few minutes as no adjustments are necessary.

EXTRA LARGE STEEL BASES support the scale, thus requiring no concrete footings. Scale furnished with baked enamel weighbeam—other vital parts are electro-plated to prevent rust and corrosion.

Write for information on other types including wheelbarrow scales, batching scales, and pit-type truck scales.

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156 NORTH FIFTH STREET

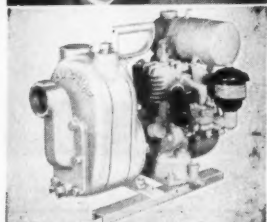
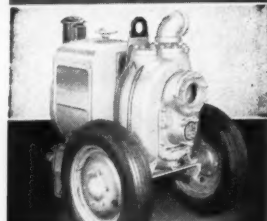
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CONSTRUCTION
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WATERLOO, IOWA

Distributor Doings

AED Talks Slanted Toward U. S. Mobilization Effort

Convention Speakers Discuss Service, Finance, Promotion, Training, Etc. in War Economy; Officers Elected

• DAKOTA pheasant with wild rice, orange juice, coffee, and rolls—that was the way the 32nd Annual Meeting of the Associated Equipment Distributors began on January 29, at 8:30 in the morning. It was the traditional Early Birds' Breakfast, sponsored this year by Region VIII (Minnesota, North Dakota, and South Dakota) in honor of retiring President C. F. Halladay. Sustained by the pheasant, AED distributor members gathered in the North Ballroom of Chicago's Stevens Hotel at 10:30 to hear committee reports and Mr. Halladay's message on the challenge posed to the construction-machinery industry by this country's mobilization effort.

Distributor Problems

At the second business session, in the afternoon, 1951 President R. L. Arnold of Arnold Machinery Co., Inc., Salt Lake City, acted as moderator for a 7-man panel which discussed distributor problems. First, the wage and price freeze, as seen by Larry Carton, Gardner, Carton & Douglas, Chicago. Then a discussion of parts inventory led by Beal Shaw, Shaw Sales & Service Co., Los Angeles. Walter Kershaw, Robinson-Kershaw Co., Salt Lake City, outlined distributor financing and credit problems, with emphasis on securing adequate down payments from customers. The merits and hazards of rental-purchase plans were reviewed by Herman Brown, Herman M. Brown Co., Des Moines; and H. D. Anderson, of Rish Equipment Co., Bluefield, W. Va., suggested ways to cut down service overhead, especially by better delivery. L. G. Harrod, Harrod Equipment Co., Syracuse, N. Y., was the final panel speaker; his topic, cooperative manufacturer-distributor advertising.

Conferences

January 30 was "Meet Your Manufacturer Day". No business sessions were scheduled. Individual conferences between the 2,000 distributors and manufacturers present were the main order of the day. This is the third year that such a day has been set aside during the AED meeting; members are so enthusiastic that the practice is likely to continue.

Election: Speakers

The morning program on January 31 opened with the election of 1951 officers, followed by addresses. Speakers were Lt. General Eugene Reybold, Executive Vice President of the American Road Builders' Association; Arthur J. Hamer, of Olson, Hamer & Co., Chicago; Colonel Robert G. Lovett, Assistant Chief of Engineers for Military Supply and Procurement; Captain E. L. Hanson, Assistant Chief for Business Management of the Navy Bureau of Yards and Docks; and Ralph L. Schiesswohl, Chief of the Construction Machinery Section, Military Division, National Production Authority.

That afternoon, there were more individual conferences between manufacturers and distributors.

Convention Highlight

The official portion of the 1951 convention program concluded on February 1 with an outstanding open-forum panel discussion of "Development and Retention of Markets for Construction Equipment". Service, credit and finance, advertising and promotion, training and education, markets, production and inventories, and general trade practices received the attention of the panel. The chairman was Kenneth Lindsay of Iowa Mfg. Co., Cedar

(Continued on next page)



Here are the AED 1951 officers. Left to right: Treasurer E. J. Crosby, Vice President S. John Oechle, Vice President J. A. Benson, President R. L. Arnold, Executive Vice President H. J. Hush, Vice President S. A. Stephens, Jr., and Executive Secretary P. D. Hermann.

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Fits door curves and flat surfaces with equal perfection. Hundreds of applications of fine, yet durable lettering in raised enamel that defies the elements. WILL NOT CRACK, CHIP, PEEL or FADE. If you are economy-minded, yet like the finest identification, you will appreciate the merits of the FLEXO-SCREEN.



It has added a much desired touch of dignity to all of our equipment and we are thoroughly pleased.



We have found the Flexo-Screens you made for us to be very satisfactory indeed.



I particularly like the balance you achieved in combining our firm name and the AGC emblem. We are very well satisfied with the results obtained.

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Attendance at the 32nd Annual Meeting of the Associated Equipment Distributors was record-shattering. Over 2,000 distributor and manufacturer members assembled to discuss the industry challenge posed by the U. S. mobilization effort.

Distributor Doings

(Continued from preceding page)

Rapids, Iowa. Tom Callaway of Good-year Tire & Rubber Co., Chicago, acted as moderator.

Distributor members who took part in the panel discussion were R. L. Arnold; R. J. Finn of Bode-Finn Equipment Co., Cincinnati, Ohio; P. A. Dufford of Intermountain Equipment Co., Boise, Idaho; Alex Kostyzak of Smith, Booth, Usher Co., Los Angeles; Frank Skidmore of Contractors Equipment & Supply Co., Albuquerque, N. Mex.; Charles Hollingsworth of Dravo-Doyle Co., Pittsburgh; and H. R. Lunn, The Boardman Co., Oklahoma City.

Manufacturer participants were William Holland, International Harvester Co.; G. H. Olson, Link-Belt Speeder Corp.; J. R. Steelman and L. J. Thelen of the Koehring Co.; C. J. Haring, J. D. Adams Mfg. Co.; and E. B. Hill, Gar Wood Industries.

Not All Business

Of course, the AED convention wasn't all business. There was that pheasant at the Early Birds' Breakfast. Luncheons on the first and last day were addressed by humorist Edward McFaul and military analyst Major Alexander P. de Seversky, respectively. There was the President's Reception the first night, the Annual Birthday Party the second night in honor of outgoing President Halladay—and, of course, the Installation Luncheon.

Officers

The 1951 slate of officers, headed by Mr. Arnold, goes this way: H. J. Hush, Griffin Equipment Corp., New York City, Region II, is Executive Vice President. Vice Presidents are J. A. Benson, Benson Tractor Co., Houston, Region X; S. J. Oechsle, Metalweld, Inc., Philadelphia, Region III; and S. A. Stephens, Jr., F. H. Hopkins & Co. Ltd., Montreal, Canada, Region XV; E. J. Crosby, Hedge & Mattheis Co., Boston, Region I, is Treasurer.

Newly elected directors are: Region II, E. H. Kliebenstein of the Ridgefield, N. J., company bearing his name; Region IV, O. W. Robinson of West Virginia Mine Supply Co., Clarksburg, W. Va.; Region VI, R. J. Finn of Bode-Finn Equipment Co., Cincinnati; Region VIII, R. E. Witthauer of Rosholt Equipment Co., Minneapolis; Region X, J. A. Benson; Region XII, L. E. Jones of Hall-Perry Machinery Co., Butte, Mont.; Region XIV, Frank Skidmore of Contractors Equipment & Supply Co., Albuquerque, N. Mex.; and Region XV, S. A. Stephens, Jr.

Garlinghouse to Build New Office

Garlinghouse Bros., Los Angeles construction-equipment distributor, will build a new 9,000-foot warehouse and salesroom. The company decided to build when its subsidiary, Gar-Bro Mfg. Co., needed more space for manufacturing its concrete-placing equipment. The Garlinghouse offices will be moved to the new \$60,000 structure at 2415 E. Washington Blvd. to make this space. Los Angeles contractor Mac-Isaac, Menke & Roach, Inc., has the contract for the building.

Halladay-Dettman Co. Is Sold

Halladay-Dettman Co., Sioux Falls, S. Dak., has sold all stocks and property to two different concerns. The J. P. Foster Co. has taken over the part of South Dakota east of the Missouri River, retaining practically the entire personnel of Halladay-Dettman. West

(Continued on next page)

32ND ANNUAL CONVENTION
ASSOCIATED EQUIPMENT DISTRIBUTORS
STEVENS HOTEL-CHICAGO-JAN 29, 1951
PHOTOGRAPH BY CONTRACTORS & ENGINEERS MONTHLY
EDGAR J. BUTTENHEIM, PUBLISHER

OSCAR
CHICAGO
57 JAN 30 1951

Distributor Doings

(Continued from preceding page)

River Equipment Co. of Rapid City, S. Dak., will serve the territory east of the river and will lease the new building Halladay-Dettman has just completed in Rapid City; this firm, too, is retaining the personnel of the old company.

Clint Halladay former President of the firm and 1950 President of the AED, has as yet no plans to announce as to his future activities.

Special Issue for Dealer Magazine

As you probably know, the H. W. Moore Equipment Co. of Denver, Colo., gets out a monthly publication called "The Look Around". The January issue is a special one dedicated to Iowa Mfg. Co., which Moore has represented for over 26 years, delivering somewhere between 125 and 150 Cedarapids crushing and screening plants in that time. There are photos in the issue of Master tandem plants, Junior tandem plants, Super Juniors, Cedarapids asphalt plants, etc. Short articles cover the Denver-Boulder Turnpike, vibrating-screen preventive maintenance, and general news on highways.

Fargo Company Distributes Diesels

Nordberg 4FS diesel engines are now distributed in North and South Dakota, and in northwestern Minnesota and northeastern Montana, by Dakota Electric Supply Co. of Fargo, N. Dak. The company, established in 1898,



For 20 years J. K. Wheeler was associated with Landis Tractor & Equipment Co. Five years ago he launched the J. K. Wheeler Machinery Co. of which he is President and General Manager.

maintains branch offices at Grand Forks, Minot, and Bismarck in North Dakota, and in Aberdeen and Rapid City in South Dakota.

Managers are, respectively, E. Shields, A. Lonberg, R. Jacobson, P. T. Talcott, and L. Young. J. D. Farnham is President of the company; A. Waller is Service Manager.

Huber Dealer for Houston Area

McCall-Gardner Machinery Co. is distributing road building and maintenance equipment made by the Huber Mfg. Co. of Marion, Ohio, in the Houston Texas, area. Sterling McCall and Bob Gardner formed the dealer company in 1950. Its offices, parts building, and warehouse are at 4720 Griggs Road in Houston.



Here is the new Wheeler plant at 1485 S. Second West Street, Salt Lake City.

New Plant for J. K. Wheeler

J. K. Wheeler Machinery Co. formally opened its \$80,000 plant at 1485 S. Second West St., Salt Lake City, with an open house on January 12 and 13. The main building at the new plant provides 6,000 square feet of floor space, including areas for sales, parts, office, and machine display. A steel structure 40 x 40 feet for displaying larger pieces of equipment is adjacent to the main building. A third building, for repairs and reconditioning covers an area of 4,800 square feet.

The 5-year-old Wheeler Co. now has exclusive franchises for R. G. Le

Tourneau, Inc.; the Buda Co.; Link-Belt Speeder Corp.; Universal Engineering Corp.; Pettibone Mulliken Corp.; George A. Haiss Mfg. Co.; Buffalo-Springfield Roller Co.; The Cleveland Trencher Co.; and several other lines. Its sales territory includes Utah, eastern Idaho, and western Wyoming.

Celebrates Christmas and 20 Years

Last December the management of R. C. Larkin Co., Chicago equipment distributor, entertained 70 employees at a combination 20th-anniversary and Christmas party. As President R. C.

(Continued on next page)

ROUGH SERVICE Will Demonstrate the Quality, Comfort and Economy of **GOODALL BOOTS and CLOTHING**



COATS-JACKETS-OVERALLS

A wide selection of styles, in rubber, oiled and latex-coated . . . for reliable wet-work and wet-weather protection, above ground or below. Every garment made to specifications that assure long, economical wear, with maximum comfort. Reinforced where extra strength is required, without impairing complete freedom of movement. All sizes.

"SSS TOE-SAVER" (R) BOOTS

First-quality black rubber boots with features that provide the ultimate in durability, comfort and safety. The famous "Toe-Saver" Safety Toe Cap withstands 3,000 lbs. pressure per square inch . . . a wide margin of protection on every job. Made with white bumper tip for positive identification. Short, three-quarter and full hip lengths. Slip-resistant Grid Tread soles.

"WEAR KING" BOOTS. Same as above, but without the "Toe-Saver" feature.

GLASS "HARD BOILED" SAFETY HATS . . .

Easiest to wear, yet providing greatest head protection. Exceed highest established requirements for strength, heat, fire, and moisture resistance, dielectric tests, etc.

Also, a complete line of rubber, oiled and latex-coated hats, in soft, "squam", cape and other styles.

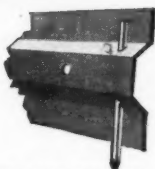
GOODALL in boots and clothing means three-way value: **QUALITY** is evident in every respect—materials, workmanship, fine appearance. **COMFORT** makes them easy to wear under all working conditions. **DURABILITY** assures real economy—a lot of extra wear between replacements, regardless of rough use. Contact our nearest branch for complete information.



GET ALL YOUR PAVING JOINT MATERIALS FROM ONE RELIABLE SOURCE!

KEYSTONE
ASPHALT PRODUCTS COMPANY

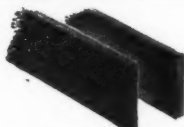
You can depend on Keystone quality and service. Have what you need, when you need it. Save on freight by buying from one reliable source. Benefit by lower prices by combining shipments. Keystone modern, efficient methods and products require fewer man-hours. You save money every way with Keystone!



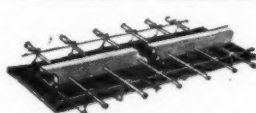
TONGUE AND GROOVE JOINTS
Eliminate blow-ups, prevent spalling, control cracking. Use with or without dowel bars. Rugged asphalt mastic composition outlasts metal. Millions of feet in use.



DUMMY JOINTS
Economical plane of weakness type. Gives straight alignment transversely or longitudinally. Fast installation with simple, inexpensive metal U-channel guide.



EXPANSION JOINTS
Two types. Choose non-extruding, resilient fibre joint or premoulded, waterproof asphalt joint. Meet all Federal and State specifications. Approved by CAA and U.S. Engineers.



WATERPROOF BASE PLATES
Prevents water seepage under the joints. Acts as water seal for sub-grade and also helps keep wire supporting basket from sinking out of position during pouring.



CONCRETE CURING COMPOUND
Retains 95% of moisture during vital curing period. Comes with fugitive dye or white pigment. Automatic spray machines available for any size job. Write for folder.

KAPCO Fiberglass EXPANSION JOINT

OUTSTANDING FEATURES:

- Complete Asphalt Impregnation
- Highly Resistant to Rot
- Decreased Breakage Loss
- Available in Slab or Cut to Specifications
- Superior in Performance

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KEYSTONE
ASPHALT PRODUCTS COMPANY
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GOODALL RUBBER COMPANY

GENERAL OFFICES, MILLS and EXPORT DIVISION, TRENTON, N. J.
Branches: Philadelphia • New York • Boston • Pittsburgh • Chicago • Detroit • St. Paul • Los Angeles
San Francisco • Seattle • Portland • Salt Lake City • Denver • Houston • Distributors in Other Principal Cities

Distributor Doings

(Continued from preceding page)

Larkin told his employees when he opened the evening's events, the company started in small rented quarters with only two employees and a first-year sales volume of about \$25,000. Its current annual volume is now some \$3,500,000; it owns a modern headquarters building in Chicago; and is building a new branch plant in Rockford, Ill.

Highlight of the celebration: six employees with 10 or more years of service with the company received gold watches. After dinner, Jim Awad, Manager of the Larkin Parts Department, presided as master of ceremonies over a drawing of Christmas gift prizes, one for everyone. Dancing topped off the evening.

New V. P. for King & Kringel

King & Kringel Machinery Corp. of Denver has appointed J. M. East Vice President and General Manager. He was formerly with Independent Pneumatic Tool Co. of Aurora Ill. King &



Three Huber 10-ton 3-wheel rollers work on a new highway between Guadalajara and Ameca, Mexico. The contractor, Constructora Latino S. A., bought the machine from Equipas Industriales y Agrícolas, S. A., Huber's distributor in Mexico City. The rollers are also being used on a large airport between Guadalajara and Chapala.

Kringel distributes Hyster equipment in Colorado, southeast Wyoming, and eastern Nebraska.

Dealers, East and West, for Heil

Latest on The Heil Co. distributor roster are Eastern Trailer & Equipment Co., Trenton, N. J., and Southern Equipment & Supply Co., San Diego, Calif. Eastern will sell Heil bodies and hoists; Southern will handle Heiliners and other road machinery.

Eastern Trailer & Equipment Co. was started in 1941 by its present owner,

Russell A. Pickens, after considerable experience with truck bodies and trailers. Southern Equipment & Supply Co. came into existence in 1939. Philip Davenport heads it; Hugh McArthur is Executive Vice President; E. T. Guymond, Jr., is Vice President; and Clifton Coates is Secretary-Treasurer.

Is Working With Hough Dealers

Marshall O. Nystrom is the new District 7 representative for The Frank G. Hough Co. He is working with distributors of Hough Payloaders in California, Nevada, Utah, and Arizona. He makes his headquarters in Los Angeles.

Southwest to Handle B-E Line

Southwest Machinery Co. of Oklahoma City, Okla., with branches in Tulsa, Hobart, and Guymon, now handles throughout the state the general-purpose excavators and Hydro-Cranes made by Bucyrus-Erie Co.

Visits Latin American Dealers

Wisconsin engine distributors in Latin America have received good-will visits, during the last two months, from Irving Le Beau, Export Sales Manager of Wisconsin Motor Corp. of Milwaukee. Mr. Le Beau attended the Rio de Janeiro Road Show in early January, and then embarked on his 2-month tour of southern Brazil, Argentina, Paraguay, Uruguay, Chile, Peru, Ecuador, Colombia, and Venezuela distributors.

L. A. Representative for Eriez

C. D. Sutton, Inc., is now handling the complete line of Eriez Mfg. Co. in the Los Angeles area. The line includes Memco electromagnetic separation

equipment and RCA electronic metal detectors. The company, headed by Charles Sutton, will make available complete research and laboratory facilities, with the cooperation of Eriez and Memco.

Sell Joy Units, Maine, Pennsylvania

Eastern Tractor & Equipment Co. of Portland is now exclusive distributor in Maine of equipment made by Joy Mfg. Co., including portable air compressors, wagon drills, paving breakers, spaders, tampers, rock drills, and hoists.

Capitol Equipment Co., Inc., of Harrisburg, Pa., is now Joy distributor in 16 counties of Central Pennsylvania, west of Berks and Northumberland Counties.

Safety Built Into Herd Annex

The Herd Equipment Co. of Oklahoma City has completed its new annex building to house its service department, and safety is the keynote in the shop. Safety color coatings identify (Concluded on next page)



McConnaughay
HEAT ACTIVATED
"MULTI-PUG"
ASPHALT MIXER

MODEL HTD
CABLE: McCONN
K. E. McCONNAUGHAY

The Patching Mixer
for Summer or Winter

HOT or COLD mixtures.
Unexcelled for patching.
Small jobs a cinch to complete right on the site.

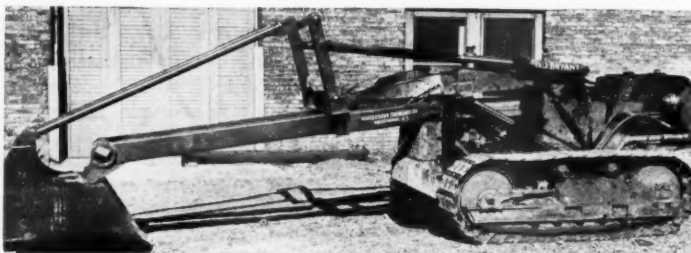
McConnaughay
EMULSIFIED ASPHALT
PLANTS AND PROCESSES
LAFAYETTE, IND.—U.S.A.

HEAVY-DUTY TRENCHER

A heavy-duty trench digger, which is designed for a wide variety of trenching for any highlift tractor with hydraulic bucket control.

It will increase the tractor's production from 30 to 50 per cent, and is easily attached by one man in 15 minutes.

The Whitestown trencher is equipped with a ½-yard standard bucket. Special buckets, made to individual specifications, may be obtained. It will dig to a depth of 8 feet and dump at a height of 12 feet. This trencher has been in constant use for



The Whitestown Trencher is now available for use on the following hydraulic controlled tractors:

Allis-Chalmers HD-5G equipped with TS-5 Tractor-Shovel Caterpillar D-4 and Trackson HT-4
International TD-6 & TD-9 equipped with new Bucyrus-Erie dozer-shovel.
International TD-6, TD-9 & TD-14-A with Hough Bulldozer-shovel
Hough Model HM-Payloader

three years, and has proved to be rugged and satisfactory in every way.

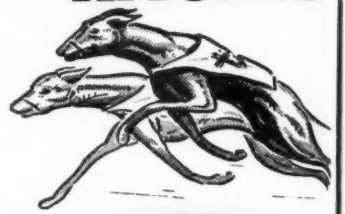
Immediate delivery can be made.

WHITESTOWN TRENCHER CO., INC.

Wood Road, Whitesboro, New York

Phone: Utica 6-1117

IT'S SPEED In DOG RACING



In PILE DRIVING

It's SUPER-VULCAN OPEN TYPE DIFFERENTIAL-ACTING PILE HAMMERS 18C, 30C, 50C and 80C

Super-Vulcan drives 'em down fast with double the number of smashing blows per minute, more penetration of each pile per blow, a saving of one-fourth to one-third the steam. Positive action on all types of piles.

Marked economy comes through the Super-Vulcan's fast action, through simple design, rugged strength, and durability for minimum maintenance costs. The open type fits the same leads and uses the same accessories as the Worthington-Vulcan Single Acting Pile Hammer. Write for complete details.



VULCAN IRON WORKS
Since 1852
329 North Bell Avenue
Chicago 12 Illinois

Distributor Doings

(Continued from preceding page)

the proper application or possible dangers of repair tools. Yellow paint identifies moving objects, blue paint marks controls and electric switches, fire extinguishers carry Scotchlite backgrounds, and barricade signs point to other dangers. Electric plugs have a safety device to eliminate the danger of working with electric tools. Jack Myracle manages this safety-conscious shop.

Grader-Roller Account for Waterloo

In Iowa, in all but the western counties, Waterloo Steel & Equipment Co. of Waterloo, Iowa, is now exclusive distributor for Warco motor graders and Hercules road rollers made by W. A. Riddell Corp. George N. Cousins is the President of the distributing firm.

Steel-Handling Straddle

Featured in a new Straddle Truck catalog issued by Hyster Co., 2902 N. E. Clackamas, Portland 8, Oreg., is the Model MHS, especially designed for handling steel. A variation of the standard 30,000-pound capacity Model MH Straddle Truck, the new model is intended for operations where service is unusually severe.

Its chief improvements are double-row roller chains in the hoist mechanism instead of single-row chain; a solid bar rather than channel sections in the lifting links; increased carrying capacity of the suspension springs; and a heavier frame in the cross members and corner sections.

Although the capacity of the steel-handling truck is rated the same as that of the standard Hyster MH3, the suspension springs have added carrying capacity to accommodate consistent handling of capacity loads. Hydraulic steering is optional and is available with either the MHS3 or the conventional MH3. It minimizes effort on the part of the operator in maneuvering the vehicle in close limits, as well as on the highway, city streets, or in other traffic conditions, the catalog says.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 626.



Designed for mechanized cleanup during and after construction, the Wilshire Power Sweeper Model 1000-M is available with a 36 or 48-inch width of sweep.

Small Power Sweeper For Building Cleanup

A compact multipurpose power sweeper for cleanup work during and after construction has been developed by Wilshire Power Sweeper Co., 526 W. Chevy Chase Drive, Glendale 4, Calif. Designed for mobility, the Wilshire Model 1000-M will turn completely around in its own track. It is available with a 36 or 48-inch width of sweep; each size has a gutter brush attachment. Time and money can be saved by mechanized cleanup operations with this unit, the company states.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 577.

Subsurface Exploration

Bulletin 33 prepared by Acker Drill Co., Inc., Scranton 3, Pa., describes the company's complete line of diamond and shot core drills, soil-sampling tools, and other equipment for subsurface exploration. Designed for portable use in rugged terrain, the Acker drills may be skid, wheel, or Jeep-mounted.

The Teredo Model TH, illustrated in the folder, features hydraulic feed and a compact electric motor suitable for underground, prospecting, drainage-hole, and blast-hole drilling. The Model KR is a heavy-duty shot core drill with a rack and pinion feed. According to the bulletin, it can open up holes 20 inches in diameter and may be obtained as a complete rig with tower-type derrick mounted on a 1-ton truck.

The literature points out that all moving parts of these tools are made of heat-treated steel with Timken oversized bearings used throughout. Acker manufactures all accessories needed to make a complete rig—diamond and shot bits, core barrels, drill rods, hoisting and water swivels, safety clamps,

pipe-driving weights, chopping and jabbing bits, and a variety of augers and tubes for recovering undisturbed samples of earth.

This literature on Acker drills, etc., may be obtained from the company, or by using the Request Card at page 16. Circle No. 575.

IT'S A MATTER OF RECORD...

A Dotmar pays for itself in the first mile of paving!

On the Eden Parkway, new fast link to Chicago's north suburbs, Robt. A. Anderson & Milburn Bros., Contractors, are paving gutters with a Dotmar Speedmaster Self-Propelled Curb and Gutter Paver at speeds from 5' to 10' per minute. There is no other machine like the Dotmar—it's made for these times.



At left, Dotmar with outrigger which can be extended 12'6" to 20'6". Monolithic curb side of machine runs on form, street side is supported by wheel. It is shown bridging 18'6" slab—half the width of this street. Burlap being dragged to brush slab. Dotmars pave sidewalks too, up to 60" wide. Ask for literature.

Dotmar INDUSTRIES Inc.

519 HANSELMAN BLDG., KALAMAZOO, MICH.

Announcing... the Self-Propelled

CONCUT CONCRETE SAW

THE GREATEST NAME IN CONCRETE SAWS



features

- SELF-PROPELLED... HANDLES SO EASILY A CHILD CAN OPERATE IT
- SPINDLE SPEED TACHOMETER ON DASH PANEL
- BLADE GUARD, EASILY REMOVED
- IMPROVED WATER SPRAY ASSEMBLY
- ROLLER BEARINGS
- WATER PRESSURE GAUGE ON DASH PANEL
- MOTOR THROTTLE AND STOP-BUTTON ON DASH PANEL
- LEVER LOCK... ENABLES OPERATOR TO REMOVE BLADE FROM CUT, THEN LOWER TO SAME DEPTH WITHOUT CHANGING ADJUSTING SCREW
- RUGGED CONSTRUCTION

years ahead...

IN ENGINEERING FEATURES!

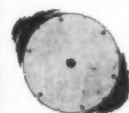
years ahead...

IN MONEY-MAKING ADVANTAGES!

No other concrete saw gives you the advanced-design features found in the new CONCUT! The self-propelled feature alone, puts the CONCUT far ahead in the field and assures you of longer blade life and lower cutting costs with maximum ease of operation. The dash panel, showing water pressure, spindle speed, etc., gives the operator constant control of cutting operation. These features and many more make the CONCUT your best buy in concrete saws... remember you can't have CONCUT advantages unless you have a CONCUT! Write today.

CONCUT BLUE BLADES...

Imitated by Many... Equalled by None Tests prove that CONCUT BLUE BLADES out-perform other concrete cutting blades to give you lowest cost per sawing foot.

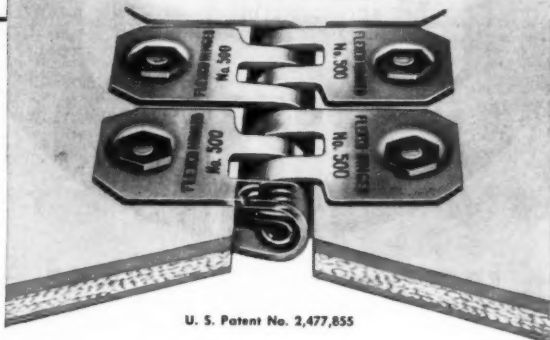


For economy and appearance... saw before breaking.

CONCRETE SAWING EQUIPMENT, INC.

200 Union National Bank Building, Pasadena 1, Calif.

... the new separable
**FLEXCO HINGED
BELT FASTENERS**



U. S. Patent No. 2,477,855

- For joining grader, trencher, ditcher and other earth moving conveyor belts.
- For belts 3/8" to 1/2" thick.
- A FLEXCO fastener that is HINGED. Has removable hinge pin.
- Troughs naturally, operates through take-up pulleys.
- Strong, durable... pull or tension is distributed uniformly across joint.

Order From Your Supply House. Ask for Bulletin HF 500.

FLEXIBLE STEEL LACING CO. 4608 Lexington St., Chicago 44, Ill.

Altimetry Grows New Techniques and Uses

Aerial-Photo Mappers and Pipeline Company Use It to Save Time; Newest Method Is "Leapfrog" Technique

• SOME interesting uses of altimetry—uses which take full advantage of the time-saving feature of this method of surveying—were described by Lester E. Demler, Sales Engineer, Wallace & Tiernan Products, Inc., at the Tenth Annual Meeting of the American Congress on Surveying and Mapping in Washington, D. C.

Altimetry is used extensively in geological and geophysical surveys. Geologists use altimeters for measuring the depth of exposed rock strata and for reconnaissance. More accurate use is made of them in geophysical exploration where elevations are required to within 1 to 5 feet in order to adjust gravity and seismic surveys. In many areas it is impossible for spirit-leveling parties to keep up with geophysical parties, and altimetry has speeded up the determination of elevations so that the geophysical parties can proceed unhampered and thereby reduce field costs.

Principle of Altimetry

The basic principle of altimetry is that the pressure caused by the weight of the column of air above the observer decreases as the observer rises in altitude. The relationship between pressure and altitude is not constant since air is compressible. Furthermore, changes in air density caused by variations in temperature, relative humidity, and gravity change the pressure-versus-altitude ratio.

In order to eliminate the need for converting pressure readings to altitude in feet and the mechanism is designed so that the pointer deflects the same amount for equal changes in altitude. This provides a linear scale and, when calibrated in this fashion, the instrument is properly called an altimeter. In order to calibrate an altimeter, a standard pressure-altitude relationship is used. Because altitude is rela-

tive to pressure, it should be stressed that the altimeter can be used only to measure difference in elevation with respect to some base or reference station, preferably a known point of elevation.

The pressure-altitude relationship holds good only for certain standard conditions. If these conditions do not exist while the survey is being made, then corrections have to be applied. Temperature has the greatest effect on the density of the air and is, therefore, the most significant. A correction for relative humidity is required only when high humidity occurs with high temperature. The temperature and humidity corrections are obtained from a chart supplied with altimeters. The correction for gravity is insignificant and is rarely applied.

The air - temperature correction should not be confused with the instrument-temperature correction. The altimeter indication may change if the instrument temperature is altered, even though the atmospheric pressure remains constant. High-grade altimeters are compensated so that the correction is small and need not be applied unless temperatures at successive stations differ widely.

Barometric pressure changes affect the altimeter just as altitude changes do. Since the atmosphere is continually changing, it is necessary to take pressure changes into consideration. The success with which pressure changes are evaluated determines the accuracy of the altimeter survey. During bad weather and when there are high, gusty winds, atmospheric conditions are very unstable and altimetry will not yield accurate results.

Some of the Uses

In preparing topographic maps from aerial photographs, a considerable number of supplemental control elevations are required. Several government and

private mapping agencies have used the two-base method of altimetry for obtaining vertical control which satisfies the requirements for 40-foot contour maps and, in some instances, 20-foot contour maps. In addition to obtaining the control in a fraction of the time required by other methods, it is possible to obtain a considerable surplus of

elevations which will help the photogrammetrist. One agency summarized two years' work with altimeters. Where elevations were checked by other surveying methods, the differences amounted to less than 2 feet on 41 per cent of the points, less than 5 feet on 75 per cent of the points, and less than

(Continued on next page)

Cut Costs!

with **ONAN** portable
ELECTRIC PLANTS

Take 'em Anywhere!

Increase your profits by using fast-working, cost-cutting electric tools on every job, even where highline power is not available. Lightweight, sturdy, Onan engine-driven electric plants supply instantly-available power anywhere for lights, drills, saws, pipe-



MODEL 3CX
3,000 watts A.C.
5,000 watts D.C.
with carrying frame
or dolly-mounted

threaders, planers, spades, tampers, repair-shop tools and other motor-driven equipment. Carry 'em, wheel 'em, or truck 'em right to the spot and plug in for all the power you need. Equipped with carrying handles or dolly-mounted.

Lightweight Air-Cooled Models: A. C.—400 to 3,000 watts. D.C.—750 to 5,000 watts. Heavy-duty models to 35,000 watts.

Write for Free Folder!

D. W. ONAN & SONS, INC.

7467 University Ave. S. E., Minneapolis, Minnesota

What the Contractor and User of Heavy Equipment Have Been Looking For . . .

CALOMATIC TRADE MARK TAGLINES



Illustrated at left is model "E" equipped with 20" reel, 400 lbs. pull with a range of 65 feet. If equipped with 30" reel it will deliver 270 lbs. with a 96-foot range.

CALOMATIC TAGLINE provides a constant tension on your tagline with a maximum of 20% increase or decrease. Calomatic Taglines steady your buckets and assure you trouble-free performance. The following quotation from a leading user tells our story "Our company has two Calomatic Taglines installed on a 3 and a 3½-yard clamshell bucket. Calomatics are fully satisfactory and have improved the operation and increased capacity of cranes."

CALOMATICS are manufactured in five sizes for your present equipment. Reels ranging from 14 to 30-inch diameter deliver approximately 75 to 400-lbs. pull with a range of approximately 65 to 96 feet.

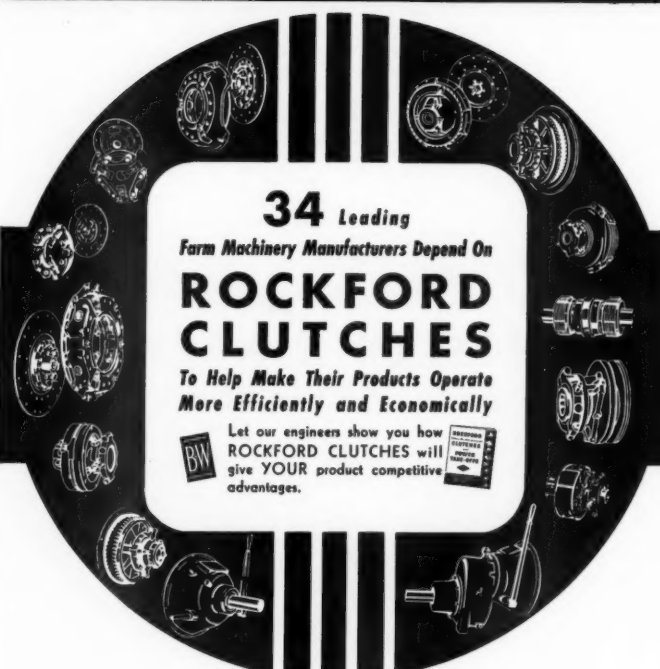
LET US KNOW YOUR REQUIREMENTS WE WILL SUPPLY THE TAGLINE

CALOMATIC TAGLINE
TRADE MARK

MANUFACTURED BY
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10 feet on 95 per cent of the points observed.

A 5-foot contour map covering 530 acres required only 276 man-hours for all operations from preliminary reconnaissance to trial profile. Elevations determined by altimetry were marked directly on a 26 x 26-inch aerial photograph with a scale of 1 inch equals 200 feet, and the 5-foot contours were interpolated in the usual fashion. A test profile showed that 95 per cent of the elevations checked were within one-half the contour interval.

Another example: the Magnolia Pipe Line Co. of Dallas, Texas, constructed a pipeline from Texas to Illinois. It was necessary to obtain a profile of the location so that the pumping stations would be properly situated. In order to save time, the profile was obtained by means of altimetry using the single-base method. On this project, the base station was located at a bench mark as near as possible to the center of a day's travel along the route. A roving altimeter would start at each end of the line corresponding to a day's run, and proceed toward the base altimeter until the two roving altimeters met. In rough terrain encountered in the Ozarks, bench marks were few and far between and it was necessary to establish the base station as much as 15 miles from the route. The pumping stations were located according to the profile obtained by altimetry. Later the profile was rerun by spirit-leveling, and the average difference between the two profiles was found to be only 4 feet. The altimetry profile was obtained in one-quarter of the time required by the same crew which later ran a spirit-level profile over the same route after the pipeline was completed.

Single-Base Method

In the single-base method of altimetry, one altimeter is stationed at a base and read at 5 or 10-minute intervals throughout the working day. Wet and dry-bulb thermometer readings are taken at the base station and significant changes in weather are noted. A roving altimeter is read simultaneously with the base altimeter to determine the correction to the roving altimeter which will make them agree.

Following the initial comparison, the roving altimeter advances to the first field station where the altitude reading, the air temperature, and time of the observation are recorded. Succeeding field

stations are visited and the same data obtained. At the end of the working period, the roving altimeter returns to the base station where a comparison is made against the base altimeter to check the initial corrections. Several altimeters often operate from the same base station, making it possible to obtain additional observations at selected field stations in order to check results.

To determine the elevation of a field station, the altitude reading is compared to the base-altimeter reading which was taken at the time, and the difference in altitude is calculated. The dry-bulb temperatures at the base station and the field station are averaged and the relative humidity at the base station is determined from the wet and dry-bulb temperatures. The correction for temperature and humidity is obtained from the altimeter chart and applied to the altitude difference. The corrected altitude difference gives the elevation of the field station with respect to the base station.

With the roving altimeter staying within 1,000 feet vertically and 15 miles horizontally of the base station, the single-base method will determine elevations with an average error of 5 feet and a maximum error of 18 feet. Decreasing the maximum elevation difference between roving and base altimeters to 200 to 300 feet will reduce the average error to 3 feet and the maximum error to 12 feet.

Two-Base Method

The two-base method, which was developed by Professor Kissam at Princeton University a few years ago, is an altimetry procedure which does not require temperature and relative-humidity corrections. One base station is established at a low point in the area being surveyed and a second base station at a high point. The difference in elevation between the upper and lower base stations must be accurately known. Both bases are occupied with altimeters which are read simultaneously at frequent intervals.

Roving altimeters then visit the points at which elevations are desired and the altitude reading and time of observation are noted for each field station. To find the elevation of the field station, the difference in altitude readings taken simultaneously at the field station and the lower base is obtained, and so is the difference in altitude readings between upper and

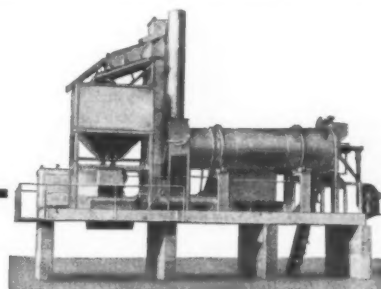
lower bases. Since the difference in elevation between bases is known, a simple proportion yields the true difference in elevation between the field station and the lower base. Recently a computer for the two-base method has been available; this eliminates calculations.

The simultaneous reading of the base altimeters provides a continuous calibration of the air column over the area being surveyed against which the roving-altimeter readings are compared. It is efficient to use several roving altimeters while the two bases are in op-

eration. The two-base method will determine elevations with an average error of 3 feet and a maximum error of 10 feet, even with the two bases separated as much as 1,000 feet vertically and 10 miles horizontally. Reducing the vertical separation to 200 feet and bringing the bases closer together will decrease the average error to 2 feet and the maximum error to 7 feet.

New "Leapfrog" Method

A brand-new method of altimetry
(Concluded on next page, Col. 2)



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Bar No.	NOMINAL DIMENSIONS ROUND SECTIONS				REQUIREMENTS OF DEFORMATIONS		
	Unit Wt. Lbs./Ft.	Diameter-Inches Decimal	Cross Sectional Area Sq. Inches	Perimeter	Max. Avg. Spacing In.	Min. Height Inches	Max. Gap. Inches
2†	0.167	0.250	0.05	0.785	...	...	...
3	0.376	0.375	0.11	1.178	0.262	0.015	0.143
4	0.668	0.500	0.20	1.571	0.350	0.020	0.191
5	1.043	0.625	0.31	1.963	0.437	0.028	0.239
6	1.502	0.750	0.44	2.356	0.526	0.038	0.286
7	2.044	0.875	0.60	2.749	0.612	0.044	0.334
8	2.670	1.000	0.79	3.142	0.700	0.050	0.383
9‡	3.400	1.128	1.00	3.544	0.790	0.056	0.431
10‡	4.303	1.270	1.27	3.990	0.889	0.064	0.487
11‡	5.313	1.410	1.56	4.430	0.987	0.071	0.540

†Bar numbers are based on the number of 1/4 inches in the nominal diameter of the section.

‡Bar number 2 in plain rounds only.

§Bars numbered 9-10-11 correspond to former 1" sq., 1 1/4" sq., and 1 3/4" sq. sizes, and are equivalent to those former standard bar sizes in weights and nominal cross-sectional areas.

¶Chord of 12 1/2% of Nom. Perimeter.



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Its complete line of hydraulic front-end tractor loaders has been modified, announces Wagner Iron Works, now celebrating its 100th year in the structural-steel fabricating and building-specialty business. Modifications include a heavily reinforced removable dipper stick, improved bearing pivot construction, side-thrust plates, main-frame improvements, and increased visibility.

These loaders are available for many tractor models including Ford, Ford-Ferguson, Ferguson, John Deere, Allis-Chalmers, Le Roi, Minneapolis-Moline, Case, and International-Harvester. A new model has also been developed for the Farnall Cub tractor and International-Harvester Super A. Additional loaders are under test for many other makes and models of tractors, the company says. Loader attachments include material buckets, crane lift, backfill blade, fork lift, and snowplow.

Further information may be secured from the company at 1905 S. First St., Milwaukee 1, Wis. Or use the Request Card at page 16. Circle No. 571.

Air-Compressor Device Removes Oil, Water, Dirt

A circular describing the Aridifier, a device said to clean and dry compressed air and to remove 92 per cent of the oil, water, and dirt in gas and air lines, is offered by Logan Engineering Co., 4901 W. Lawrence Ave., Chicago 30, Ill. The data sheet points out the features of this unit and its principle of operation. Additional information is given on size selections, ordering, and installation.

This literature may be obtained from the company, or by using the Request card at page 16. Circle No. 657.

Front-End Stability Of Heavy-Duty Trucks

An 8-page report about front axles for motor trucks has been prepared by The Timken-Detroit Axle Co., Detroit 32, Mich. It analyzes the problem of front-end stability in heavy-duty trucks from both the driver's and the vehicle owner's viewpoint, and outlines the features of the new F-900 Series Timken-Detroit front axles. Two-color diagrams illustrate the effect of tire size on turning angle track, and axle bending.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 562.

Air-Operated Light

A portable air-operated light for use where compressor service is available has been developed by Alliance Electric Works, Ltd., 141 Bates Road, Montreal, Quebec, Canada. It consists of an air motor, 6-volt generator, voltage regulator, and an air regulator; and it has an air consumption of approximately 9 cfm. The Emergi-Air-Lite will operate on an air pressure from 30 to 125 psi.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 576.



The Emergi-Air-Lite—a portable air-operated light.

Altimetry Grows New Techniques and Uses

(Continued from preceding page)

called the Leapfrog method was described by Mr. Demler. It was devised recently by Bell Telephone Laboratories. The same temperature and relative-humidity corrections are required as are used in the single-base method, but the observational procedure is different.

In the Leapfrog method, two altimeters are read simultaneously at a base station. Then one altimeter, A, remains at the base station while the other, B, advances to the first field station. The two altimeters are read simultaneously and the difference gives the elevation of the first field station after the appropriate temperature and relative-humidity corrections are applied.

Then altimeter A leaves the base station and leapfrogs the first field station and advances to the second field station. Meanwhile, altimeter B remains at the first field station and again the altimeters are read simultaneously. The difference in altitude reading is corrected and determines the elevation of the second field station with respect to the first field station. Then the altimeters are brought together at the second field station and read. After the comparison, altimeter B advances to the third field station; altimeter A leapfrogs to the fourth field station; and the altimeters are compared at the fourth field station. The survey may be speeded up by employing additional altimeters and by comparing altimeters at every third or fourth field station instead of at alternate stations.

The advantage of the Leapfrog method lies in the fact that the altimeters are always close together and, therefore, operate under the same atmospheric conditions. This contrasts with the fixed-base methods where the roving altimeters move away from the base altimeters and perhaps encounter pressure and temperature conditions which do not effect the base altimeters. In effect, with the Leapfrog method, the base station is carried along with the roving altimeters by comparison at alternate stations. Tests have shown the Leapfrog method will determine elevations with an average error of 1 foot and a maximum error of 4 feet, where the two-base method yields an average error of 2.5 feet and a maximum error of 10 feet.

Cuts Surveying Costs

The revival of altimetry in the past decade, Mr. Demler said, came about just when surveyors and engineers were seeking ways of combating the high cost of field parties. Altimetry was adopted for a number of projects and produced elevations at a considerable saving in time and manpower. The adoption of new altimetry procedures such as the Leapfrog method, and the development of new instruments such as a recorder for base stations, will no doubt advance the use of altimetry further. There are probably many surveying requirements which, if analyzed with regard to the accuracy expected in the end result of a project, would be met with altimetry and benefit from reduced field costs, Mr. Demler concluded.

Data on Portable Conveyors

A 4-page catalog on portable conveyors for materials handling has been released by The Fairfield Engineering Co., Marion, Ohio. The four models described in the folder include an aluminum utility conveyor, a lightweight troughed-belt conveyor, a heavy-duty troughed-belt conveyor, and a power-moved troughed-belt conveyor. The conveyors are available with lengths from 14 to 35 feet and discharge heights 8 feet 9 inches to 15 feet

5 inches.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 627.

Shifts at Republic Rubber

Warren Ingersoll, who formerly was in charge of the Philadelphia office of the Republic Rubber Division of Lee Rubber & Tire Corp., will now devote all his time to his duties as Assistant

to the President of Lee, and will be in the company's main office in Conshohocken, Pa. C. Russell Conklin, Eastern District Manager, will take over the management of the Philadelphia office.

Ray L. Beveridge, recently appointed Field Engineer, will headquarter at the Philadelphia office, from which he will contact organizations in the area in the interest of Republic's rubber belting, hose, and molded and extruded products.



(Above)—Model 7-A, a small grader but a big performer with many good features. Also, the Model 80, heavier, better for high banks with its longer reach.



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181	24	"	16-4
18	20	"	12-4
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1	18	"	16-4
142	18	"	11-0
4	16	"	8-0
180	14	"	12-6
35	12	"	12-6
1	12	"	6-0
2	12	"	5-10
15	10	"	16-4
4	10	"	12-4
10	8	"	16-4
7	8	"	16-4
19	6	"	16-4
3	6	"	12-4
4	16	Figd.	12-0
4	14	"	9-2
11	8	"	12-0
2	6	"	10-0
1	4	"	12-0
11	16	PE	12-0
4	12	"	8-0
39	8	"	16-0
22	3	"	16-0
1	18	Figd.	6-9
1	10	"	3-7
2	4	"	12-0

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QUANTITY	SIZE	TYPE	B & S
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7	14	"	"
1	14	"	"
5	10	"	"
1	8 x 6	"	"
3	4	"	"
6	3	"	"
1	24	1/2 Bends	"
7	18	"	"
88	16	"	"
11	14	"	"
72	10	"	"
1	6	"	"
4	10	1/16 Bends	"
1	3	"	"
8	36	1/32 Bends	"
1	14	1/4 Bends	B & S
90	10 x 8	"	"
6	18	1/2 Bends	"
27	16	"	"
34	10	"	"
1	24	Tees	Ball Ends
1	14	"	"
2	12	"	"
2	8	"	"
2	24 x 14	"	"
3	24 x 10	"	"
1	20 x 18	"	"
1	20 x 16	"	"
6	18 x 16	"	"
1	18 x 14	"	"
13	18 x 6	"	"
17	16 x 6	"	"
11	14 x 6	"	"
2	14 x 12	"	"
6	14 x 8	"	"
18	14 x 6	"	"
1	10 x 6	"	"
1	8 x 3	"	"
1	3 x 2	"	"
1	8 x 6 x 8	"	"
1	8 x 6 x 6	"	"
2	18 x 18 x 18	B S & B Bends	"
14	16 x 16 x 8	"	"
7	16 x 16 x 6	"	"
1	14 x 14 x 12	"	"
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Hossfeld Mfg. Co.	36	Warsop Power Tools, Inc.	44
Hough Co., Frank G.	79	Waukesha Motor Co.	56
Ingersoll-Rand Co.	82	Wellman Engineering Co.	94
International Harvester Co.	42, 43	Wellman Co., S. K.	62
Interstate Rubber Products Corp.	62	White Co., David	57
Iowa Mfg. Co.	32, 33	White Mfg. Co.	105
Irvington Form & Tank Corp.	74	Whitestown Trencher Co., Inc.	102
Jaeger Machine Co.	30	Wickwire Spencer Steel Div., The	
Jahn Trailer Div., Pressed Steel Car Co., Inc.	58	Colorado Fuel & Iron Corp.	67
Johnson Co., C. S.	34	Williams Mfg. Co., Hugh B.	105
Kato Engineering Co.	72	Winpower Mfg. Co.	67
Keystone Asphalt Products Co.	101	Winslow Scale Co.	75
Koehring Co.	35	Worthington Pump and Machinery Corp., Worthington Ransome- Construction Equipment Div.	37
Kwik-Mix Co.	35	Wyeth-Scott Co.	63
Laclede Steel Co.	105		
Lansing Co.	9		



10 GIANT-SIZED "A" TOURNAPULLS speed Oahe DAM

*Consistently deliver 667 yds. hourly
on 1½-mi. cycles for Campbell-Collins*

With approximately 3½ million yards of sand, gravel, clay and shale to move on Oahe Dam subcontract at Pierre, South Dakota, Campbell & Collins Joint Venture of Fargo, N. D., assigned 80% of total dirtmoving to 10 giant-sized, rubber-tired A Tournapulls. Seven of the 240 h.p., two-wheel "A" prime movers were coupled to 25-ton (22-yd.) E-25 Carryall Scrapers and three to 35-ton (30-yd.) E-35 Carryalls. Here's a report on how their performance is speeding this Missouri River flood control project:

When these pictures were taken, the fleet was hauling tough, sun-baked sandy clay from 2 pits, one with loading on the level and the other with loading down 35% grades. Time and distance for obtaining loads varied widely,

even within the same pit, due to necessity of selecting soil to meet U. S. Engineer fill requirements. In the level pit, two 144 h.p. pushers teamed up to help Tournapulls get heaped loads in 70 to 115 seconds (average, 93 seconds) with a load distance 175 to 250 ft. In the downhill pit, using one 144 h.p. pusher, Tournapulls cut load time to 25 to 35 seconds (average, 38 seconds), and load distance to about 75 ft. From both pits, the E-25 Carryalls were getting average loads of 16 pay yards . . . the larger E-35's, 21 pay yards.

Haul cycles from both pits averaged 1½ miles . . . with 3700 ft. of favorable 9% grade to dump and 4225 ft. of adverse 0 to 14% grades on return. Giant 4-wheel air brakes — with 1812 sq. in. of braking surface on each wheel—

permitted safe use of haul speeds up to 34 m.p.h. Dumping on the run helped each electric-control Tournapull complete a 7925-ft. round trip every 13.1 minutes. On the basis of 50-minute efficiency, that's 3.8 trips per hour per unit, and an hourly output for each of the 7 E-25 scraper-equipped rigs of 61 cubic yards and for each of the 3 E-35's of 80 cubic yards.

Drive 190 miles to Pierre

Six of these Tournapulls are veterans of another big earthfill project — the Shadehill Dam, built across the Grand River near Lemmon, South Dakota. Their efficiency record on this job for the entire 1949 season was 85%. When their work here was finished, the 6 rigs drove under their own power to Pierre . . . a 190-mile trip through main highway traffic.

Like Campbell-Collins, it will pay you to investigate the big pay loads and new low dirtmoving costs possible on your work with these mobile, 35-ton (30-yd.) and 25-ton (22-yd.) A Tournapulls. Your LeTourneau Distributor has all the facts . . . call him, or write TODAY.

By September, 1950, 6 of Campbell-Collins' A Tournapulls had worked 4000 hours each on Shadehill and Oahe Dams . . . 4 newer "A's" had clocked 500 hours each here at Oahe. The Oahe job is being subcontracted from Guy H. James Construction Company of Oklahoma City, Oklahoma.

LETOURNEAU
PEORIA, ILLINOIS



TOURNAPULLS

FOR LOWEST NET COST PER YARD

Tournadozer, Tournapull, Carryall, Tournapacker—Trademark Reg. U.S. Pat. Off. C141 a

